OPTIMUM®
MASCHINEN - GERMANY

Operating manual

Version 1.1.6

Geared drill

OPTI drill® B 50GSM

Part no. 3034500

Table of contents

1 Safety
1.1 Rating plate ... 5
1.2 Safety instructions (warning notes) ... 6
1.2.1 Classification of hazards ... 6
1.2.2 Other pictograms ... 6
1.3 Intended use ... 7
1.4 Reasonably foreseeable misuses ... 8
1.4.1 Avoiding misuses ... 8
1.5 Possible dangers caused by the geared drill ... 8
1.6 Qualification of personnel ... 9
1.6.1 Target group ... 9
1.6.2 Authorized persons ... 10
1.7 Operator positions ... 11
1.8 Safety measures during operation ... 11
1.9 Safety devices ... 11
1.9.1 EMERGENCY-STOP push button ... 12
1.9.2 Main switch ... 12
1.9.3 Drilling table ... 13
1.9.4 Drill chuck protection ... 13
1.9.5 Prohibition, warning and mandatory signs ... 13
1.10 Safety check ... 13
1.11 Individual protection gear ... 14
1.12 Safety during operation ... 15
1.13 Safety during maintenance ... 15
1.13.1 Disconnecting and securing the geared drill. ... 15
1.13.2 Using lifting equipment ... 15
1.13.3 Mechanical maintenance work ... 15
1.14 Accident report ... 16
1.15 Electrical system ... 16
1.16 Inspection deadlines ... 16
2 Technical data
2.1 Electrical connection ... 17
2.2 Drilling capacity ... 17
2.3 Spindle seat ... 17
2.4 Drilling table ... 17
2.5 Working area ... 17
2.11 Emissions ... 18
2.6 Speeds ... 18
2.7 Floor loading ... 18
2.8 Environmental conditions ... 18
2.9 Operating material ... 18
2.10 Coolant equipment ... 18
2.12 Dimensions ... 19
3 Delivery, interdepartmental transport, assembly and commissioning
3.1 Notes on transport, installation, commissioning ... 20
3.1.1 General risks during internal transport ... 20
4 Assembly
4.1 Unpacking the machine ... 21
4.2 Scope of delivery ... 21
4.3 Load attachment points ... 21
4.4 Set-up and assembly ... 21
4.4.1 Assembly ... 21
4.4.2 Installation site requirements ... 21
4.4.3 Load attachment point in unpacked condition ... 22
4.4.4 Installation ... 22
4.4.5 Fixing ... 22
4.5 Cleaning of the machine ... 23
4.5.1 Lubrication ... 24
4.5.2 Electrical connection ... 24
4.6 First commissioning ... 24
4.7 Coolant pump ... 25
4.7.1 Checks ... 25
4.8 Warming up the machine ... 25
5 Operation
5.1 Safety ... 26

B50GSM_GBIVZ.fm

5.2 Control and indicating elements ... 26
5.2.1 Control panel ... 27
5.3 Drill depth stop ... 30
5.4 Spindle sleeve feed ... 30
5.4.1 Manual spindle sleeve feed ... 30
5.4.2 Automatic spindle sleeve feed ... 31
5.4.3 Handwheel for spindle sleeve fine feed ... 31
5.5 Tool holder ... 32
5.5.1 Unfitting the drill chuck ... 32
5.5.2 Fitting the drill chuck ... 33
5.6 Coolant equipment ... 33
5.7 Working with the machine ... 34
5.7.1 Preparation ... 34
5.8 Drilling ... 34
5.8.1 Drill bit ... 35
6 Determining the cutting speed and the speed
6.1 Table cutting speeds / infeed ... 36
6.2 Speed table ... 36
6.2.1 Example for calculating the required speed on your drilling machine ... 38
7 Maintenance
7.1 Safety ... 39
7.1.1 Preparation ... 40
7.1.2 Restarting ... 40
7.2 Inspection and maintenance ... 40
7.3 Repair ... 46
7.3.1 Customer service technician ... 46
7.4 Cooling lubricants and tanks ... 47
7.4.1 Inspection plan for water-mixed cooling lubricants ... 48
8 Ersatzteile - Spare parts
8.1 Ersatzteilbestellung - Ordering spare parts ... 49
8.2 Hotline Ersatzteile - Spare parts Hotline ... 49
8.3 Service Hotline ... 49
8.4 Ersatzteilzeichnungen - Spare part drawings ... 50
8.4.1 Teileliste - Parts list ... 62
8.5 Schaltplan - Wiring diagram ... 68
9 Malfunctions
10 Appendix
10.1 Copyright ... 76
10.2 Terminology/Glossary ... 76
10.3 Change information operating manual ... 76
10.4 Liability claims for defects / warranty ... 77
10.5 Storage ... 78
10.6 Advice for disposal / Options of re-use ... 78
10.6.1 Decommissioning ... 79
10.6.2 Disposal of the packaging of new devices ... 79
10.6.3 Disposing of the old device ... 79
10.6.4 Disposal of electrical and electronic components ... 79
10.6.5 Disposal of lubricants and coolants ... 80
10.7 Disposal via municipal collection ... 80
10.8 Product follow-up ... 80

Preface

Dear customer,

Thank you very much for purchasing a product made by OPTIMUM.

OPTIMUM metal working machines offer a maximum of quality, technically optimum solutions and convince by an outstanding price performance ratio. Continuous enhancements and product innovations guarantee state-of-the-art products and safety at any time.

Before commissioning the machine please thoroughly read these operating instructions and get familiar with the machine. Please also make sure that all persons operating the machine have read and understood the operating instructions beforehand.
Keep these operating instructions in a safe place nearby the machine.

Information

The operating instructions include indications for safety-relevant and proper installation, operation and maintenance of the machine. The continuous observance of all notes included in this manual guarantee the safety of persons and of the machine.

The manual determines the intended use of the machine and includes all necessary information for its economic operation as well as its long service life.

In the paragraph "Maintenance" all maintenance works and functional tests are described which the operator must perform in regular intervals.

The illustration and information included in the present manual can possibly deviate from the current state of construction of your machine. Being the manufacturer we are continuously seeking for improvements and renewal of the products. Therefore, changes might be performed without prior notice. The illustrations of the machine may be different from the illustrations in these instructions with regard to a few details. However, this does not have any influence on the operability of the machine.
Therefore, no claims may be derived from the indications and descriptions. Changes and errors are reserved!

Your suggestion with regard to these operating instructions are an important contribution to optimising our work which we offer to our customers. For any questions or suggestions for improvement, please do not hesitate to contact our service department.

If you have any further questions after reading these operating instructions and you are not able to solve your problem with a help of these operating instructions, please contact your specialised dealer or directly the company OPTIMUM.

Optimum Maschinen Germany GmbH

Dr.- Robert - Pfleger - Str. 26

D-96103 Hallstadt

Mail: info@optimum-maschinen.de

Internet: www.optimum-maschinen.com

1 Safety

Glossary of symbols

►	gives further advice
→	calls on you to act
O	enumerations

This part of the operating instructions

- O explains the meaning and use of the warning notices included in these operating instructions,
- O defines the intended use of the geared drill,
- O points out the dangers that might arise for you or others if these instructions are not observed,
- O informs you about how to avoid dangers.

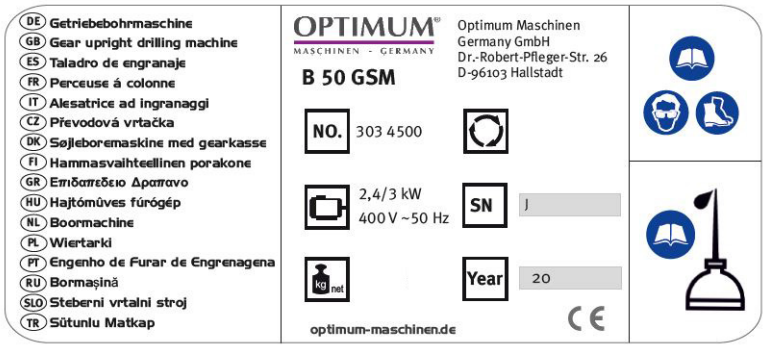
In addition to these operation instructions, please observe

- O the applicable laws and regulations,
- O the legal regulations for accident prevention,
- O the prohibition, warning and mandatory signs as well as the warning labels on the geared drill.

Always keep this documentation close to the geared drill.

If you would like to order another operating manual for your machine, please indicate the serial number of your machine. The serial number is printed on the type plate.

1.1 Rating plate



INFORMATION

If you are unable to solve a problem using these operating instructions, please contact us for advice:

Optimum Maschinen Germany GmbH
Dr. Robert-Pfleger-Str. 26

D-96103 Hallstadt

Email: info@optimum-maschinen.de

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1.2 Safety instructions (warning notes)

1.2.1 Classification of hazards

We classify the safety warnings into various levels. The table below gives an overview of the classification of symbols (ideogram) and the warning signs for each specific danger and its (possible) consequences.

Ideogram	Warning alert	Definition / consequence
	DANGER!	Threatening danger that will cause serious injury or death to people.
	WARNING!	A danger that might cause severe injury to the staff or can lead to death.
	CAUTION!	Danger of unsafe procedure that might cause injury to the staff or property damages.
	ATTENTION!	Situation that could cause damage to the geared drill and products and other types of damage. No risk of injury to people.
	Information	Application tips and other important or useful information and notes. No dangerous or harmful consequences for people or objects.

In case of specific dangers, we replace the pictogram by

general danger — by a warning of — injury of hands, — hazardous electrical voltage, — or — rotating parts.

1.2.2 Other pictograms

Warning of danger of slipping!

Warning risk of stumbling!

Warning hot surface!

Warning biological hazard!

Warning of automatic start-up!

Warning tilting danger!

Warning of suspended loads!

Caution, danger of explosive substances!

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Activation forbidden!

Use ear protection!

Read the operating instructions before commissioning!

Disconnect the mains plug!

Use protective glasses!

Use protective gloves!

Use protective boots!

Use protective suit!

1.3 Intended use

WARNING!

In the event of improper use, the machine

- **will endanger personnel,**
- **the machine and other material property of the operating company will be endangered,**

the correct function of the machine may be affected.

The geared drill is designed and manufactured for holes in cold metals or other non flammable materials or that not constitute a health hazard using a rotating filing-stripping tool that has a number of grooves for collecting the filings.

The geared drill machine must only be used with a quick-action drill chuck.
Chucks that require a key to secure the bit must not be used on this geared drill.

If the geared drill is used in any way other than described above, modified without authorization of Optimum Maschinen Germany GmbH, then the geared drill is being used improperly.

We will not be held liable for any damages resulting from any operation which is not in accordance with the intended use.

We expressly point out that the guarantee or CE conformity will expire due to any constructive technical or procedural changes which had not been performed by the company Optimum Maschinen Germany GmbH.

It is also part of intended use that you

- observe the limits of the geared drill,
- the operating manual is observed,
- the inspection and maintenance instructions are observed.

► Technical data on page 17

WARNING!

Extremely severe injuries.

It is forbidden to make any modifications or alternations to the operation values of the geared drill. They could endanger the staff and cause damage to the geared drill.

1.4 Reasonably foreseeable misuses

Any other use as the one determined under the "Intended use" or any use beyond the described use shall be deemed as not in conformity and is forbidden.

Any other use has to be discussed with the manufacturer.

It is only allowed to process metal, cold and non-inflammable materials with the geared drill.

In order to avoid misuses it is necessary to read and understand the operating instructions before the first commissioning.

The operators must be qualified.

1.4.1 Avoiding misuses

→ Use of suitable cutting tools.
→ Adapting the speed adjustment and feed to the material and workpiece.
→ Clamp workpieces firmly and vibration-free.

ATTENTION!

The workpiece is always to be fixed by a machine vice, jaw chuck or by another appropriate clamping tool such as for the clamping claws.

WARNING!

Risk of injury caused by workpieces flying off.

Clamp the workpiece in the machine vice. Make sure that the workpiece is firmly clamped in the machine vice resp. that the machine vice is firmly clamped on the machine table.

→ Use cooling and lubricating agents to increase the durability of the tool and to improve the surface quality.
→ Clamp the cutting tools and workpieces on clean clamping surfaces.
→ Sufficiently lubricate the machine.
→ Correctly adjust the bearing clearance and the guidings.

It is recommended:

→ Insert the drill in a way that it is exactly positioned between the three clamping jaws of the quick action chuck.

When drilling make sure that

→ the suitable speed is set depending on the diameter of the drill,
→ the pressure must only be such that the drill can cut without load
→ in case of too strong pressure the drill will get worn early or even might break resp. get jammed in the hole. If the drill gets jammed immediately stop the main motor by pressing the emergency stop button,
→ for hard materials, e.g. steel, use commercial cooling / lubricating agents,
→ generally always drive the turning spindle out of the workpiece.

1.5 Possible dangers caused by the geared drill

The geared drill is state-of-the-art.

Nevertheless, there is a residual risk as the geared drill operates with

- at high speeds,
- rotating parts,
- with electrical voltages and currents.

We have used construction resources and safety techniques to minimize the health risk to persons resulting from these hazards.

If the geared drill is used and maintained by the staff who are not duly qualified, there may be a risk resulting from incorrect or unsuitable maintenance of the geared drill.

INFORMATION

Everyone involved in the assembly, commissioning, operation and maintenance must

- be duly qualified,
- strictly follow these operating instructions.

In the event of improper use

- there may be a risk to the staff,
- there may be a risk to the machine and other material values,
- the correct function of the geared drill may be affected.

Always disconnect the geared drill if cleaning or maintenance work is being carried out.

WARNING!

The geared drill may only be used with the safety devices activated.

Disconnect the geared drill immediately whenever you detect a failure in the safety devices or when they are not mounted!

All additional devices installed by the operator have to be equipped with the prescribed safety devices. This is your responsibility being the operating company! ► Safety devices on page 11

1.6 Qualification of personnel

1.6.1 Target group

This manual is addressed to

- the operating companies,
- the users,
- the staff for maintenance works.

Therefore, the warning notes refer to both operation and maintenance of the geared drill.

Determine clearly and explicitly who will be responsible for the different activities on the machine (operation, maintenance and repair).

Unclear responsibilities constitute a safety risk!

Always switch off the main switch of the geared drill. This will prevent it from being used by unauthorized staff.

The qualifications of the staff for the different tasks are mentioned below:

Operator

The operator is instructed by the operating company about the assigned tasks and possible risks in case of improper behaviour. Any tasks which need to be performed beyond the operation in the standard mode must only be performed by the operator if it is indicated in these instructions and if the operating company expressively commissioned the operator.

Electrical specialist

Due to his professional training, knowledge and experience as well as his knowledge of respective standards and regulations the electrical specialist is able to perform works on the electrical system and to recognise and avoid any possible dangers himself.

The electrical specialist is specially trained for the working environment in which he is working and knows the relevant standards and regulations.

Specialist staff

Due to their professional training, knowledge and experience as well as their knowledge of relevant regulations the specialist staff is able to perform the assigned tasks and to recognise and avoid any possible dangers themselves.

Instructed persons

Instructed persons were instructed by the operating company about the assigned tasks and any possible risks in case of improper behaviour.

1.6.2 Authorized persons

WARNING!

Inappropriate operation and maintenance of the geared drill constitutes a danger for the staff, objects and the environment.

Only authorized staff may operate the geared drill!

Persons authorized to operate and maintain should be trained technical staff and instructed by the ones who are working for the operating company and for the manufacturer.

Obligations of the operating company

Obligations of the operating company

- O train the staff,
- O instruct the staff in regular intervals (at least once a year) on
  - all safety standards that apply to the machine,
  - the operation,
  - accredited technical guidelines,
- O check staff's state of knowledge,
- O document the trainings/instructions,
- O require staff to confirm participation in training/instructions by means of a signature,
- O check whether the staff is working safety- and risk-conscious and observe the operating instructions.

Obligations of the user

Obligations of the operator

- O have obtained a training regarding the handling of the geared drill,
- O know the function and mode of action,
- O before taking the machine in operation
  - have read and understood the operating manual,
  - be familiar with all safety devices and instructions.

Additional requirements regarding the qualification

For work on the following parts there are additional requirements:

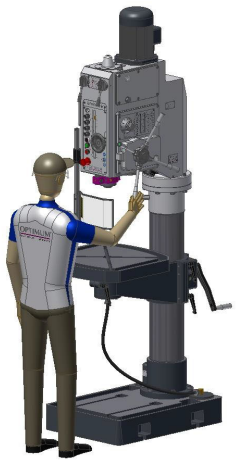
- O Electric components or operating materials: Must only be performed by a qualified electrician or person working under the instructions and supervision of a qualified electrician.

Before carrying out work on electrical components or operating units, the following measures must be taken, in the order given.

- O Disconnect all poles.
- O Secure against switching on.
- O Check if the machine is zero potential.

1.7 Operator positions

The operator's position is in front of the geared drill.



Img. 1-1: Operator positions

INFORMATION

The mains plug of the geared drill must be freely accessible.

1.8 Safety measures during operation

CAUTION!

Risk due to inhaling of health hazardous dusts and mist.

Dependent on the material which need to be processed and the used auxiliaries dusts and mist may be caused which might impair you health.

Make sure that the generated health hazardous dusts and mist are safely sucked off at the point of origin and is dissipated or filtered from the working area. To do so, use a suitable extraction unit.

CAUTION!

Risk of fire and explosion by using flammable materials or cooling lubricants.

Before processing inflammable materials (e.g. aluminium, magnesium) or using inflammable auxiliary materials (e.g. spirit) it is necessary to take additional preventive measures in order to safely avoid health risks.

1.9 Safety devices

Use the geared drill only with properly functioning safety devices.

Stop the geared drill immediately if there is a failure on the safety device or if it is not functioning for any reason.

It is your responsibility!

If a safety device has been activated or has failed, the geared drill must only be used if you

- have removed the cause of the failure,
- have verified that there is no danger resulting for the staff or objects.

WARNING!

If you bypass, remove or override a safety device in any other way, you are endangering yourself and other persons working on the geared drill. The possible consequences are

- **injuries due to components or parts of components flying off at high speed,**
- **contact with rotating parts,**
- **fatal electrocution.**

WARNING!

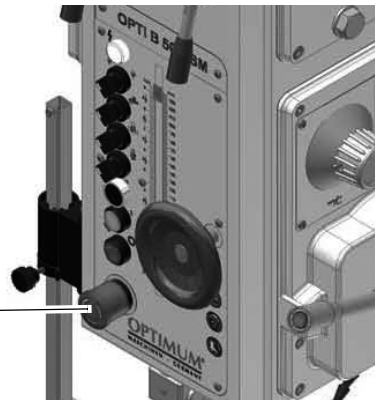
The separating protective equipment which is made available and delivered together with the machine is designed to reduce the risk of workpieces or fractions of them which being expelled, but not to remove them completely.

The geared drill includes the following safety devices:

- an EMERGENCY STOP push button,
- a lockable main switch,
- a drilling table with T-slots to fix the workpiece or a vice,
- adjustable drill chuck protection with position switch.

1.9.1 EMERGENCY-STOP push button

The geared drill is equipped with an EMERGENCY STOP impact switch.

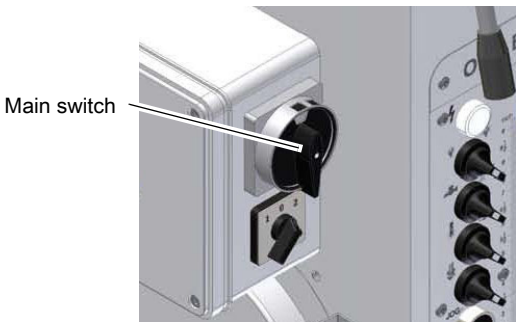


Img. 1-2: EMERGENCY STOP impact switch

1.9.2 Main switch

The lockable main switch can be secured in position "0" by a padlock to prevent unauthorized or accidental activation.

When the main switch is off, the power supply to the machine is completely interrupted.



Img. 1-3: Main switch

Except for the areas marked by the pictogram in the margin. In these areas there might be voltage, even if the main switch is switched-off.

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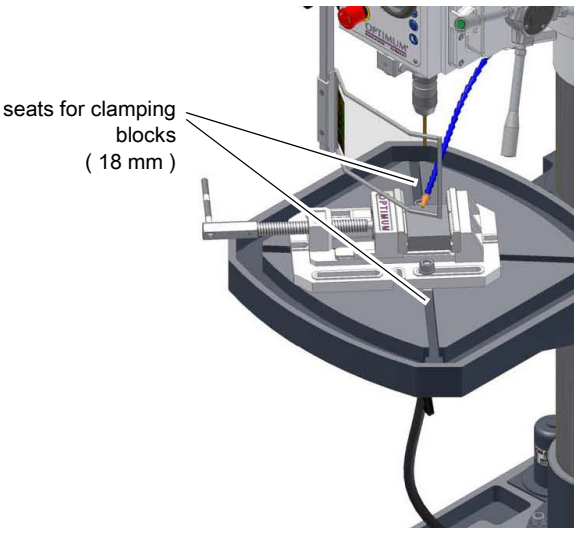
1.9.3 Drilling table

Seats for T-slots are attached to the drilling table.

WARNING!

Risk of injury due to parts flying off at high speed. Securely fix the workpiece on the drilling table.



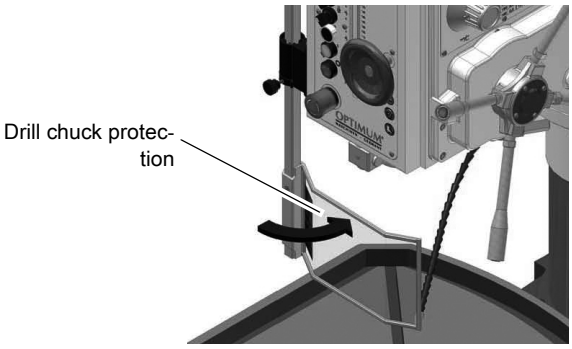
Img. 1-4: Drilling table

1.9.4 Drill chuck protection

→ Adjust the drill chuck protection to the required height.

→ Fold the drill chuck protection into place before you start drilling.

O The geared drill must only be switched on, if the drill chuck protection is closed.



Img. 1-5: Drill chuck protection

1.9.5 Prohibition, warning and mandatory signs

INFORMATION

All warning signs must be legible. Check them regularly.

1.10 Safety check

Check the geared drill at least once per shift. Inform the person responsible immediately of any damage, defect or change in operating function.

Check all safety devices

- O at the beginning of each shift (with the machine stopped),
- O once a week (with the machine in operation),
- O after every maintenance and repair work.

Check that prohibition, warning and information signs and the labels on the geared drill

- O are legible (clean them, if necessary),
- O are complete.

INFORMATION

Use the following table in order to organize the checks.

General check		
Equipment	**Check**	**OK**
Protective covers	Mounted, firmly bolted and not damaged	
Drill chuck protection		
Signs, Markings	Installed and legible	
Date:	**checked by (signature):**	

Functional check		
Equipment	**Check**	**OK**
EMERGENCY STOP impact switch	After actuating an EMERGENCY STOP push button the geared drill must be switched off.	
Drill chuck protection	The geared drill must only be switched on, if the drill chuck protection is closed.	
Date:	**checked by (signature):**	

1.11 Individual protection gear

For certain work individual protection gear as protective equipment. This includes:

- Safety helmet,
- Protective goggles or face guard,
- Protective gloves,
- Safety shoes with steel toe caps,
- Ear protection
- hairnet

Before starting work, make sure that the prescribed individual protection gear is available in the workplace.

CAUTION!

Dirty or contaminated personnel protective equipment can cause diseases.

Clean your individual protection gear

- **after each use,**
- **regularly, at least once a week.**

Personal protective equipment for special works

Protect your face and eyes: Wear a safety helmet with facial protection when performing works where your face and eyes are exposed to hazards.

Use protective gloves when handling pieces with sharp edges.

During operation of the drill, the wearing of gloves is prohibited because of the risk of winding up.

Use safety shoes when you assemble, disassemble or transport heavy components.

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1.12 Safety during operation

We specially point out the specific dangers when working with and on the geared drill.

WARNING!

Before switching on the geared drill make sure that there are no

- **no dangers generated for persons,**
- **not cause damage to equipment.**

Avoid any risky working practices:

- Make sure that nobody is endangered by your work.
- The instructions mentioned in these operating instructions have to be strictly observed during assembly, operation, maintenance and repair.
- Do not work on the geared drill, if your concentration is reduced, for example, because you are taking medication.
- Observe the accident prevention regulations issued by your Employers Liability Insurance Association or other competent supervisory authority, responsible for your company.
- Inform the supervisor about all endangerments or errors.
- Stay at the geared drill until all movements have come to a complete standstill.
- Use the prescribed personnel protective equipment. Make sure to wear a well-fitting work suit and, if necessary, a hairnet.
- Do not use protective gloves when drilling or milling.

1.13 Safety during maintenance

Inform the operators in good time about any maintenance and repair works.

Report all safety relevant changes and performance details of the geared drill. Document all changes, have the operating instructions updated accordingly and train machine operators.

1.13.1 Disconnecting and securing the geared drill.

Turn off the main switch of the geared drill before starting any maintenance or repair work.

Use a padlock to prevent the switch from being turned on without authorization and keep the key in a safe place.

All machine parts as well as any dangerous voltages are switched off. Excepted are only the positions which are marked with the adjoining pictogram.

Attach a warning sign on the machine.

1.13.2 Using lifting equipment

WARNING!

The use of unstable lifting and load suspension gear that might break under load can cause severe injuries or even death.

Check that the lifting and load suspension gear

- **they have sufficient load carrying**
- **and that it is in perfect condition.**

Observe the accident prevention regulations issued by your Employers Liability Insurance Association or other competent supervisory authority, responsible for your company.

Fasten the loads properly. Never walk under suspended loads!

1.13.3 Mechanical maintenance work

Remove or install protection safety devices before starting any maintenance work and re-install them once the work has been completed.This includes:

- Covers,

- Safety indications and warning signs,
- earth (ground) connections.

If you remove protective or safety devices, re-fit them immediately after the completing the work. Check if they are working properly!

1.14 Accident report

Inform your superiors and Optimum Maschinen Germany GmbH immediately in the event of accidents, possible sources of danger and any actions which almost led to an accident (near misses).

There are many possible causes for "near misses".

The sooner they are notified, the faster the causes can be eliminated.

1.15 Electrical system

► Electrical specialist on page 9

Have the machine and/or the electric equipment checked regularly. Immediately eliminate all defects such as loose connections, defective wires, etc.

A second person must be present during work on live components to disconnect the power in the event of an emergency. Disconnect the lathe immediately in case of failure of the power supply!

Comply with the required inspection intervals in accordance with the factory safety directive, operating equipment inspection DGUV, formerly BVG.

The operator of the machine must ensure that the electrical systems and operating equipment are inspected with regards to their proper condition, namely,

- by a qualified electrician or under the supervision and direction of a qualified electrician, prior to initial commissioning and after modifications or repairs, prior to recommissioning
- and at certain intervals.

The deadlines must be set so that arising, foreseeable defects can be detected in time.

The relevant electro-technical rules must be followed during the inspection.

The inspection prior to initial commissioning is not required, if the operator receives confirmation from the manufacturer or installer that the electrical systems and operating equipment comply with the accident prevention regulations. See EC Declaration.

Permanently installed electrical systems and operating equipment are considered constantly monitored, if they are continually serviced by qualified electricians and inspected by means of measurements within the scope of operation (e.g. monitoring the insulation resistance).

1.16 Inspection deadlines

Define and document the inspection deadlines for the machine in accordance of the Factory Safety Act and perform an operational risk analysis in accordance of the Work Safety Act. The inspection intervals in the maintenance section should be as reference values.

2 Technical data

The following information gives the dimensions and weight and is the manufacturer‘s authorised machine data.

2.1 Electrical connection	
Motor	3 x 400V 2.4kW / 3.2 KW ~50Hz (60Hz) optional 3x220V, 3x440V
Coolant pump	40 W
permitted voltage tolerance	380 V - 440 V
2.2 Drilling capacity	
Drilling capacity in steel [mm]	Ø 50
Tapping in steel [mm]	M 42
Drilling capacity in cast [mm]	Ø 60
Tapping in cast [mm]	M 50
Throat [mm]	375
Sleeve travel [mm]	230
2.3 Spindle seat	
Spindle seat	MT4
Spindle sleeve feed [mm/rev]	6 steps 0.05 -0. 3 ► Automatic spindle sleeve feed on page 31
2.4 Drilling table	
Table size [mm] Length x width	600 x 600
T-slot size [mm]	18
Maximum distance [mm] Spindle - table	800
Dimension base [mm] Length x width	600 x 860
Maximum distance [mm] spindle - stand	1300
Table load max.(kg)	300
Traversing speed motorized table height adjustment [mm/min]	450
2.5 Working area	
Height [mm]	3000
Depth [mm]	1800
Width [mm]	1200

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2.6 Speeds	
Spindle speeds ~50Hz [min $^{-1}$]	54 - 2090
Spindle speeds ~60Hz [min $^{-1}$]	65 - 2580
Number of steps	18
2.7 Floor loading	
Machine weight [kg]	950
2.8 Environmental conditions	
Temperature [° C]	5 - 35
Relative humidity [%]	25 - 80
2.9 Operating material	
Gear oil for spindle sleeve gear 2.5 liters	ISO VG 150 or a comparable oil
Toothed rod and drill column	commercial lubricating grease
2.10 Coolant equipment	
Max. height of pressure [m]	3
Tank capacity [cm^3]	5000
max. delivery volume [l/min]	2

2.11 Emissions

The airborne noise of the drilling machine is 76 to 80 dB (A) at the operator position and operating conditions in accordance with DIN ISO 8525. If the machine is installed in an area where various machines are in operation, the noise exposure (immission) on the operator of the drilling machine at the working place may exceed 85 dB(A).

INFORMATION

This numerical value was measured on a new machine under proper operating conditions. Depending on the age respectively on the wear of the machine it is possible that the noise behaviour of the machine changes.

Furthermore, the factor of the noise emission is also depending on manufacturing influencing factors, e.g. speed, material and clamping conditions.

INFORMATION

The mentioned numerical value is an emission level and not necessarily a safe working level.

Though there is a dependency between the degree of the noise emission and the degree of the noise disturbance it is not possible to use it reliably to determine if further precaution measures are required or not.

The following factors influence the actual degree of the noise exposure of the operator:

- Characteristics of the working area, e.g. size or damping behaviour,
- Other noise sources, e.g. the number of machines,
- Other processes taking place in the proximity and the period of time during which the operator is exposed to the noise.

Furthermore, it is possible that the admissible exposure level might be different from country to country due to national regulations.

This information about the noise emission shall allow the operator of the machine to more easily evaluate the endangering and risks.

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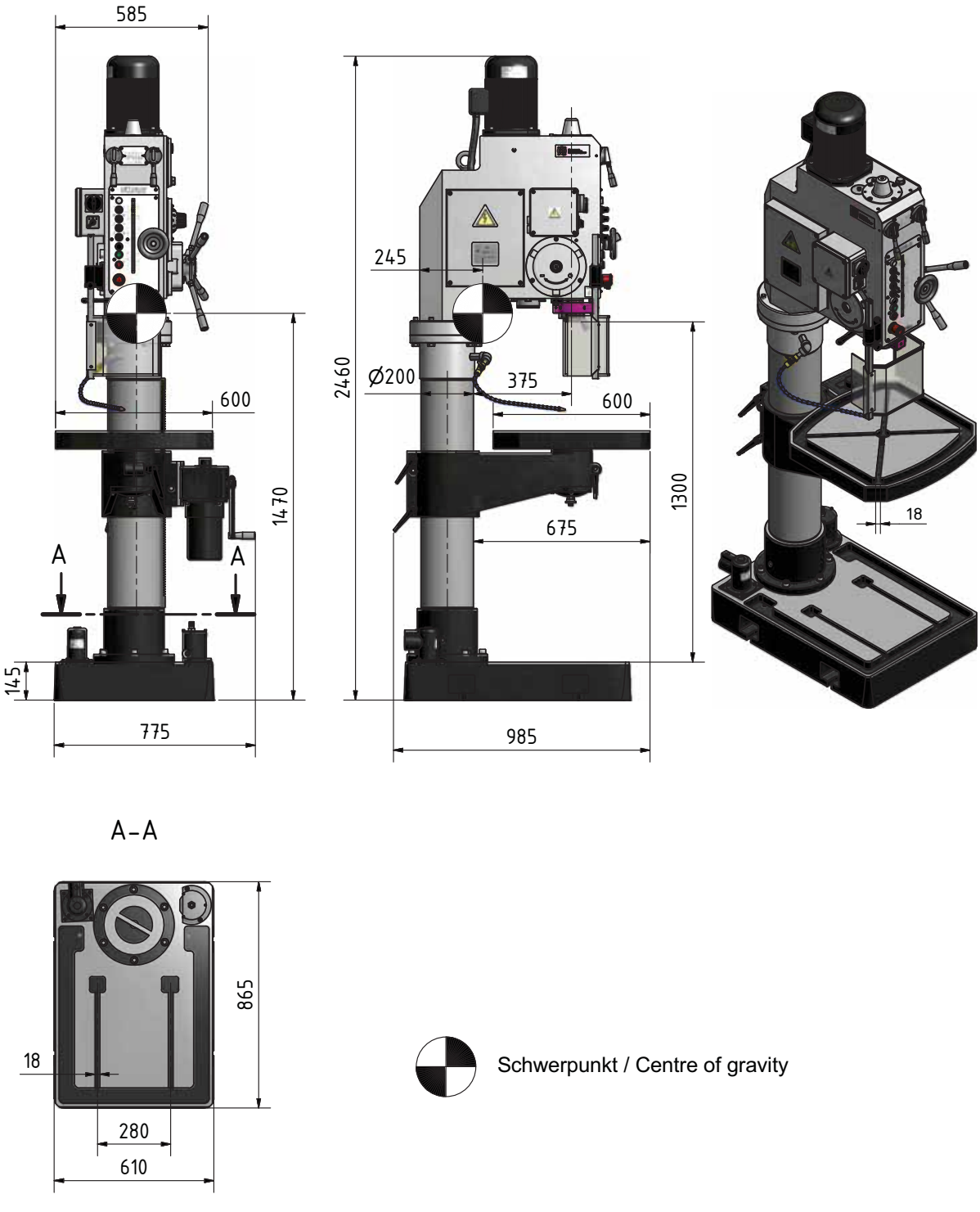
CAUTION!

Depending on the overall noise exposure and the basic limit values the machine operators must wear an appropriate hearing protection.

We generally recommend to use a noise protection and a hearing protection.

2.12 Dimensions



Img. 2-1: Dimensions

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3 Delivery, interdepartmental transport, assembly and commissioning

3.1 Notes on transport, installation, commissioning

Improper transport, installation and commissioning is liable to accidents and can cause damage or malfunctions to the machine for which we do not assume any liability or guarantee.

Transport the scope of delivery secured against shifting or tilting with a sufficiently dimensioned industrial truck or a crane to the installation site.

WARNING!

Severe or fatal injuries may occur if parts of the machine tumble or fall down from the forklift truck or from the transport vehicle. Follow the instructions and information on the transport box.

Note the total weight of the machine. The weight of the machine is indicated in the "Technical data" of the machine. When the machine is unpacked, the weight of the machine can also be read on the rating plate.

Only use transport devices and load suspension gear that can hold the total weight of the machine.

WARNING!

The use of unstable lifting and load suspension equipment that might break under load can cause severe injuries or even death. Check that the lifting and load suspension gear has sufficient load-bearing capacity and that it is in perfect condition.

Observe the accident prevention regulations issued by your Employers Liability Insurance Association or other competent supervisory authority, responsible for your company. Fasten the loads properly.

3.1.1 General risks during internal transport

WARNING: TILTING DANGER!

The machine may be lifted unsecured by a maximum of 2 cm.

Employees must be outside the danger zone, i.e. the reach of the load.

Warn employees and advise them of the hazard.

Machines may only be transported by authorized and qualified persons. Act responsibly during transport and always consider the consequences. Refrain from daring and risky actions.

Gradients and descents (e.g. driveways, ramps and the like) are particularly dangerous. If such passages are unavoidable, special caution is required.

Before starting the transport check the transport route for possible danger points, unevenness and faults.

Danger points, unevenness and disturbance points must be inspected before transport. The removal of danger spots, disturbances and unevenness at the time of transport by other employees leads to considerable dangers.

Careful planning of interdepartmental transport is therefore essential.

4 Assembly

4.1 Unpacking the machine

Transport the drilling machine in its packing crate near its final installation location with a lift truck before unpacking it. If the packaging shows signs of possible transport damage, take the necessary precautions not to damage the machine when unpacking it. If any damage is discovered, the carrier and/or shipper must be notified immediately to be able to initiate the necessary steps for a claim.

Inspect the machine completely and carefully, making sure that all materials, such as shipping documents, manuals and accessories supplied with the machine have been received.

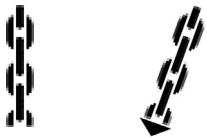
4.2 Scope of delivery

Check the machine immediately after delivery for transport damage, missing parts and loose locking bolts. Compare the scope of delivery with the attached packing list.

4.3 Load attachment points

- O Centres of gravity

- O Load suspension points (Marking of the positions for the load suspension gear)



- O Prescribed transportation position (Labelling of the top surface)

- O Means of transport to be used
- O Weights

4.4 Set-up and assembly

4.4.1 Assembly

WARNING!

Danger of crushing and overturning.
The installation of the geared drill must be performed by at least 2 persons.

4.4.2 Installation site requirements

INFORMATION

The place must comply with ergonomic workplace requirements.

→ Organize the working area around the geared drill according to the local safety regulations.

- O The work area for operation, maintenance and repair must not be restrictive.
  (► Dimensions on page 19 and ► Working area on page 17).

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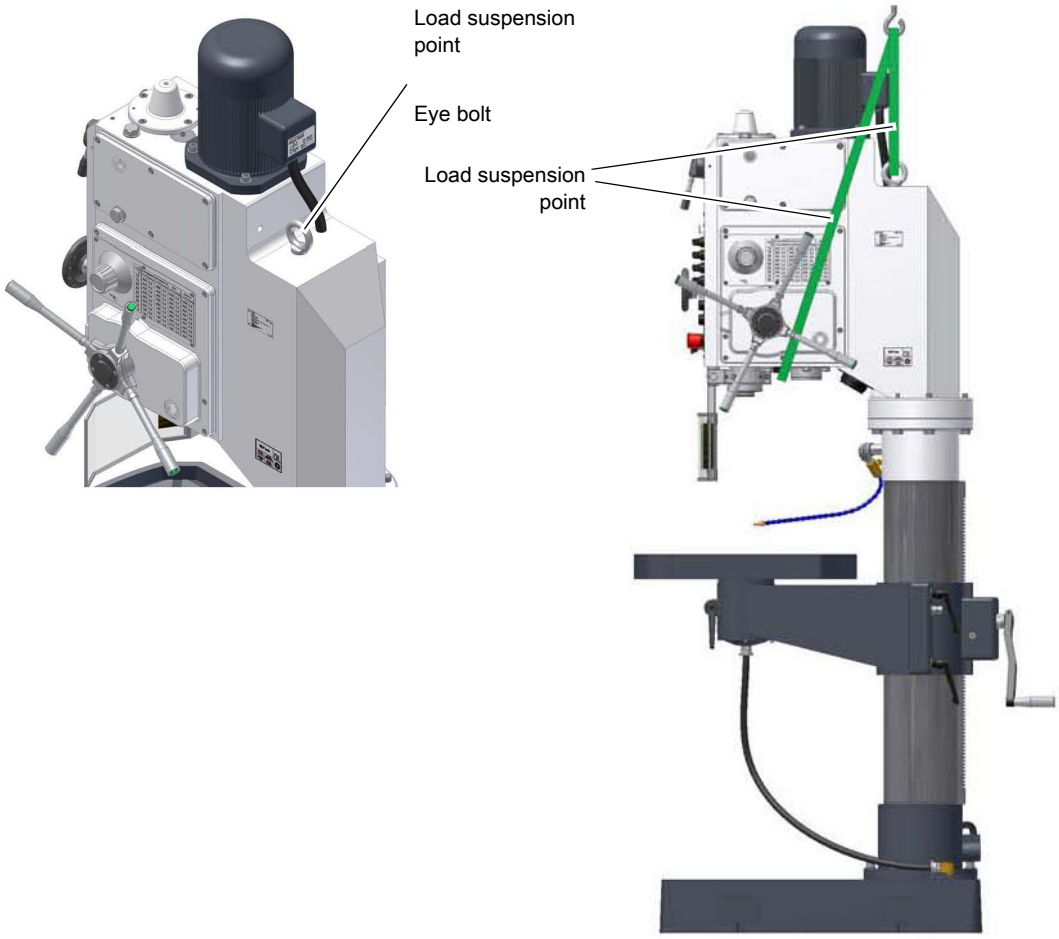
4.4.3 Load attachment point in unpacked condition



Img.4-1: Example of load suspension and lifting loads

→ Fix the load suspension gear on the eye bolt and beneath the drilling head.

→ Fasten the load end agent on the an adequate conveyor equipment, for instance a crane.

► Dimensions on page 19.

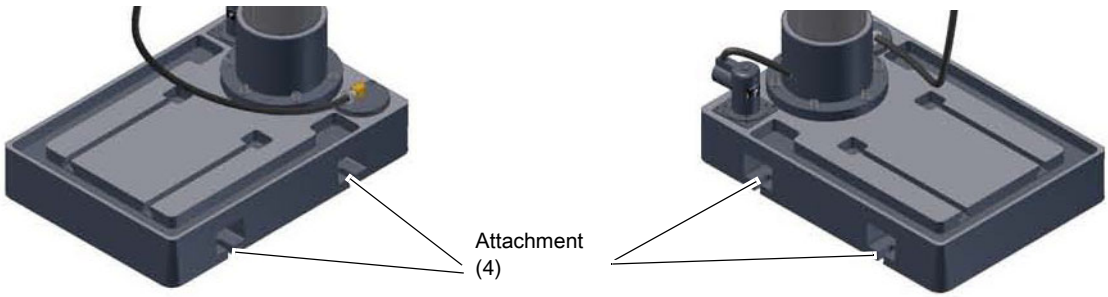
4.4.4 Installation

→ Check that the geared drill foundation is horizontal with a spirit level.

4.4.5 Fixing

→ Fix the foot of the geared drill to the substructure with the holes pre-drilled for this purpose.

► Floor loading on page 18



Img.4-2: Base B50 GSM

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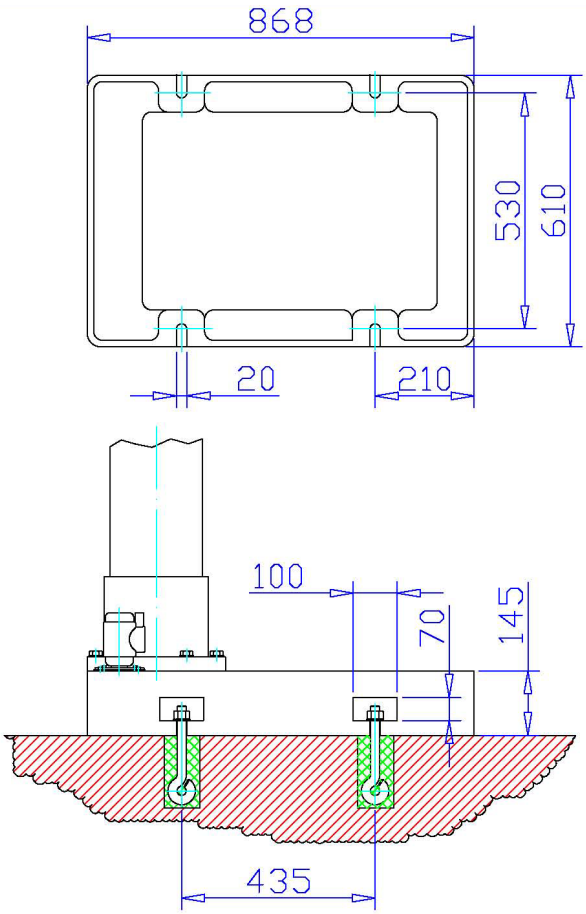

Img. 4-3: Attachment to the base

ATTENTION!

Tighten the fixing screws of the geared drill only as much that it is safely fixed and cannot break away or tilt over.

If the fixing screws are too tight in particular in connection with an uneven substructure it may result in a broken stand of the machine.

4.5 Cleaning of the machine

CAUTION!

Do not use compressed air to clean the machine.

Your new machine must be completely cleaned after it is unpacked to ensure that all moving parts and sliding surfaces are not damaged when the machine is operated. Each unit leaves the factory with all exposed parts and sliding surfaces suitably greased to avoid oxidation during the time that elapses before it is placed into operation. Remove all the wrapping and clean all the surfaces with a degreaser to soften and remove the protecting greases and coatings.

Clean all the surfaces with a clean cotton cloth and lubricate the machine as explained in the following section, before connecting the power and beginning to operate the machine.

4.5.1 Lubrication

The lubrication and initial greasing of your new machine consists of checking the oil sight glasses. The oil tanks must be filled to half way up the sight glass. Once these operations have been carried out, the machine can be started up.

→ The oil must be changed 200 hours after being filled for the first time, then after every 2000 operating hours.

► Oil level of the gear of the drilling spindle sleeve on page 43

→ Use the oil types recommended in the reference table ► Operating material on page 18. This table can be used to compare the characteristics of each different type of oil of your choice.

4.5.2 Electrical connection

CAUTION!

Install the connection cable of the machine in such a way that people will not stumble over it.

The machine is installed ready for operation with a 400V three-phase plug. Please verify if the type of current, voltage and protection fuse correspond to the values specified. A protective earth ground wire connection must be available. Mains fuse 10A to 16A

Make sure that the direction of rotation of the drive motor is correct. The switch position of the rotation selector switch for right-handed rotation (R) has to turn the drill spindle clockwise. If necessary two phase terminals on three-phase connector or your three-phase connection must be exchanged.

WARNING!

The three-phase electrical connection may only be performed by an electrician or under the guidance and supervision of an electrician.

4.6 First commissioning

WARNING!

First commissioning may only take place after proper installation.

There is a danger to persons and equipment, if the first commissioning carried out by inexperienced personnel. We do not accept any liability for damages caused by incorrectly performed commissioning.

ATTENTION!

Before commissioning the machine, all bolts, fastenings and protections must be checked and retightened as necessary!

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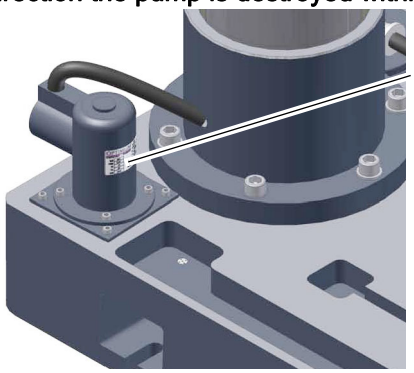
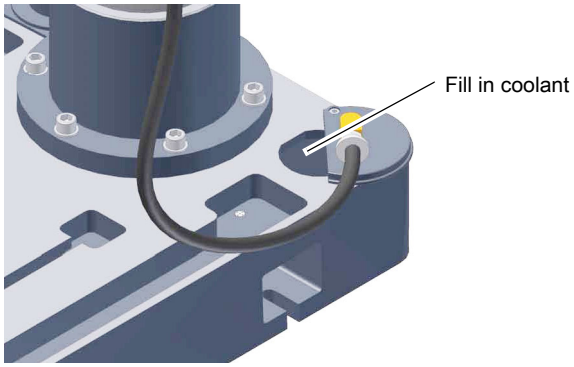
4.7 Coolant pump

ATTENTION!

The coolant pump also delivers if it turns in the wrong direction. Due to the wrong turning direction the pump is destroyed within a short time.



Img.4-4: Coolant pump of geared drill



Img.4-5: Coolant filler hole

4.7.1 Checks

→ Check the geared drill as indicated under ► Safety check on page 13.

→ Check the geared drill as indicated under ► Oil level of the gear of the drilling spindle sleeve on page 43.

4.8 Warming up the machine

ATTENTION!

If the geared drill and in particular the drilling spindle is immediately operated at maximum load when it is cold it may result in damages.

If the machine is cold, e.g. directly after having transported the machine, it should be warmed up at a spindle speed of only 500 1/min for the first 30 minutes.

5 Operation

5.1 Safety

Use the machine only under the following conditions:

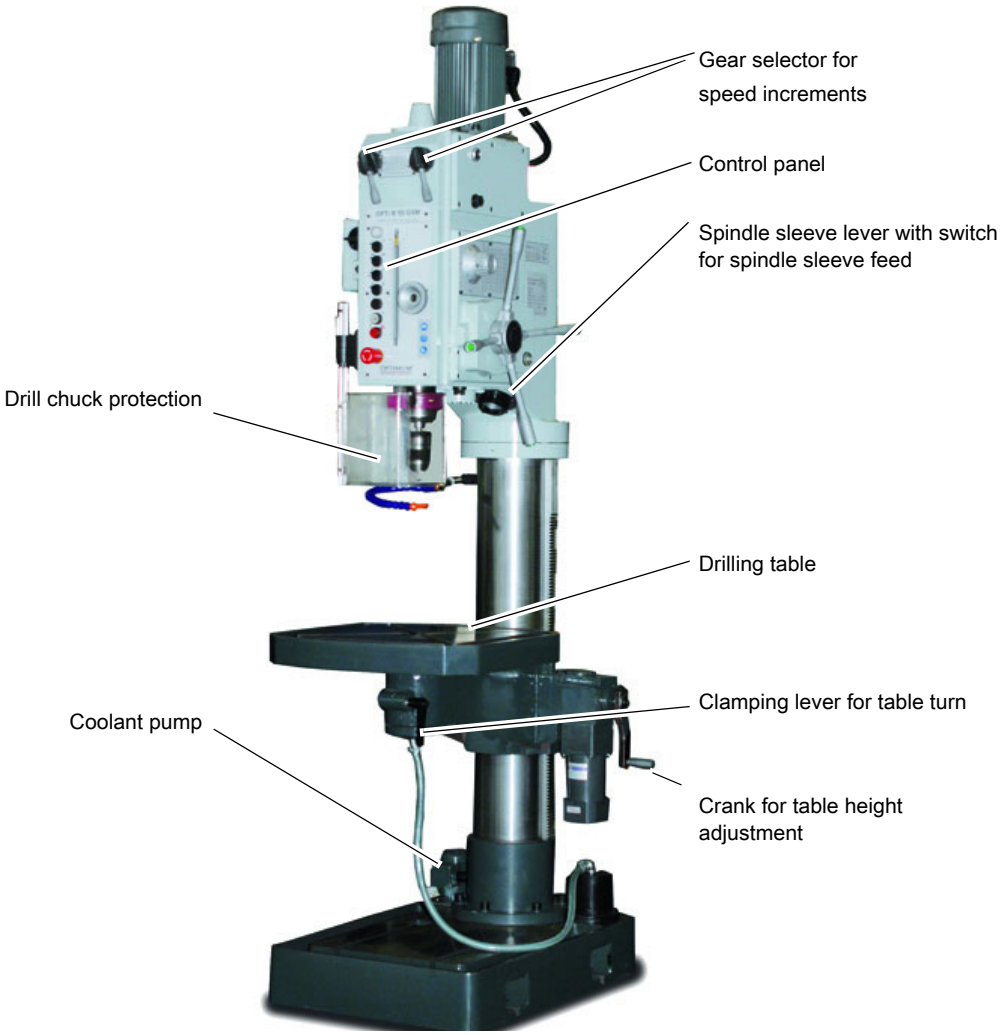
- The machine is in proper working order.
- The machine is used as prescribed.
- The operating manual is followed.
- All safety devices are installed and activated.

All failures should be eliminated immediately. Stop the machine immediately in the event of any anomaly in operation and make sure it cannot be started up accidentally or without authorization

Notify the person responsible immediately of any modification.

► Safety during operation on page 15

5.2 Control and indicating elements



Img.5-1: Geared drill B50 GSM

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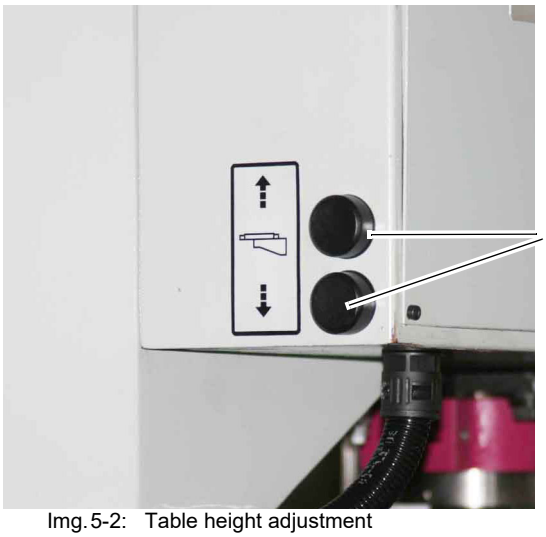
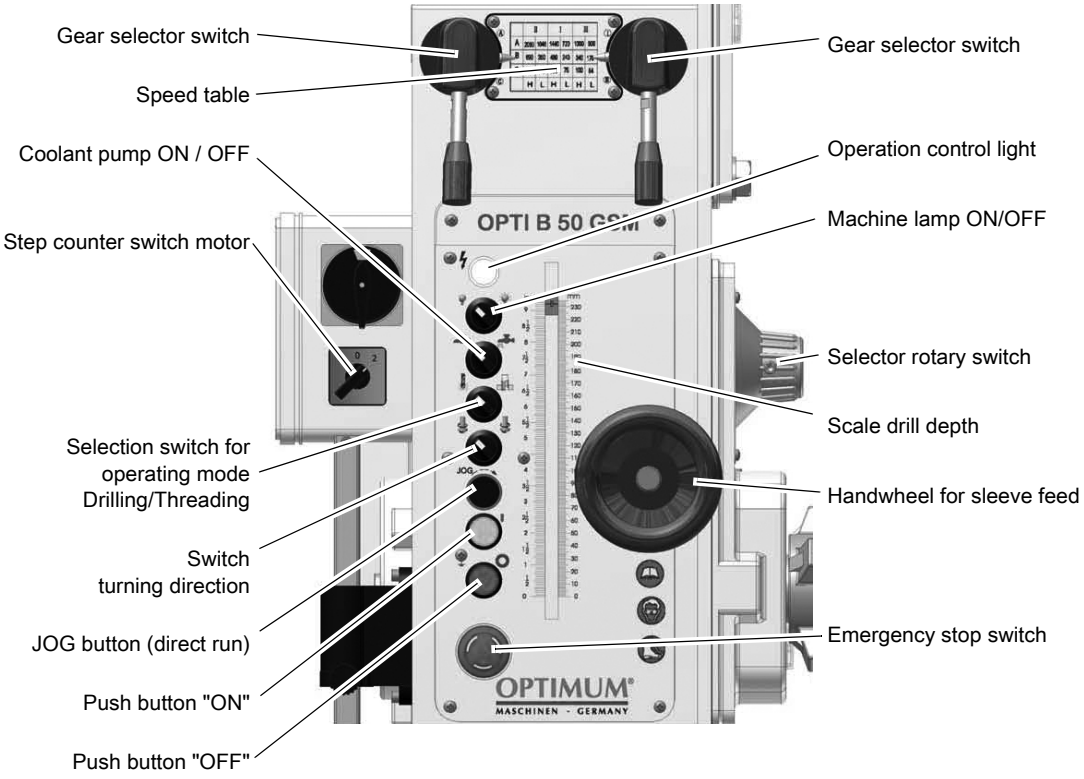


Img. 5-2: Table height adjustment

5.2.1 Control panel



Img. 5-3: Operating element on the control panel

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Operating mode selection switch

"Threading or Drilling" is selected with the selection switch.

Drilling operating mode

The auxiliary function of the micro switches in the drilling depth to the direction of rotation change is deactivated.

Operating mode threading

The function of the micro switches in the drilling depth and the function of the direction of rotation change by the push-button actuators in the spindle sleeve lever are activated.

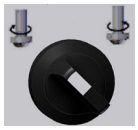
Drill depth stop

The geared drill has two micro switches in the depth stop.

The position of adjustable switching point is adjusted with the drill depth stop screw .

The adjustable switch point turns off the automatic spindle feed. In threading mode it triggers the change of direction

Rotation direction switch



The direction of rotation of the drilling spindle can be switched by actuating the rotation direction switch.

Step counter switch motor

With the step rotation switch the speed stage of the motor is selected.

Push button ON

The push button "ON" switches on the rotation of the drilling spindle.

Push button in lever for spindle sleeve feed

The push button in the spindle speed lever switches the spindle sleeve feed On or OFF.

In the mode of operation “threading“ takes place with operation a direction of rotation change. The spindle sleeve feed is switched off.

Push button OFF

The "push button OFF“ switches the rotation of the drilling spindle off.

Coolant pump ON / OFF

Switches the coolant pump.

Machine illumination ON/OFF

Switches the illumination on or off.

Operating control lamp

The operation control light on the control panel is illuminated to show that the machine is operable.

Main switch

Interrupts or connects the power supply.

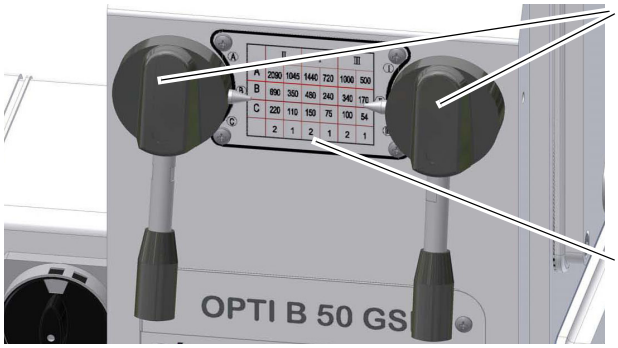
Gear selector switch

The speed of the drill spindle is set by actuating the gear selector switch and the step counter switch motor.

ATTENTION!

Changing the speed when the bit-holder spindle is turning may cause damage to the machine.

- **Disconnect the machine before changing the speed.**
- **Wait until the bit-holder spindle has come to a complete halt.**



Img. 5-4: Gear selector switch

Use the JOG button (direct run) to facilitate the engaging of the indexing positions.

INFORMATION

When choosing the right rate, use the speed table on the bit-holder head.

Speed table - for ~50Hz connection

		II		I		III	
A	A	2090	1045	1440	720	1000	500
B	B	690	350	480	240	340	170
C	C	220	110	150	75	100	54
		H	L	H	L	H	L

Img. 5-5: ~ 50Hz

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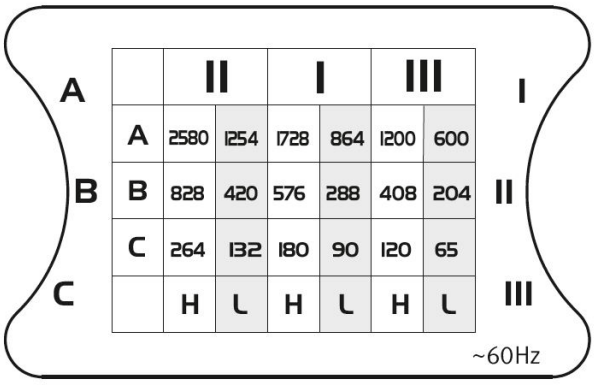
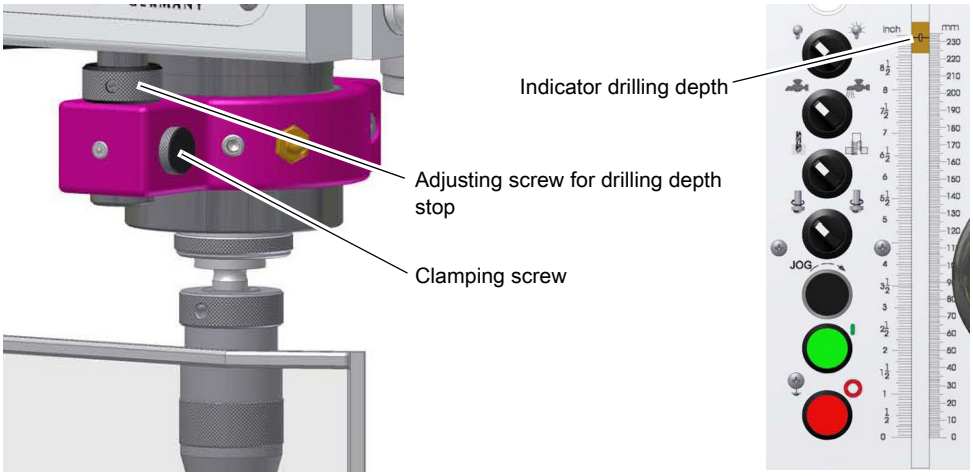
Speed table - for ~60Hz connection



Img.5-6: ~ 60Hz

5.3 Drill depth stop



Img.5-7: Drill depth stop

O Use the drilling depth stop when drilling several holes of the same depth.

→ Loosen the clamping screw for drill depth stop and move it to the left or right, until the desired drilling depth is displayed to the indicator.

→ Re-tighten the clamping screw for drill depth stop.

O The spindle can now only be lowered to the set depth.

5.4 Spindle sleeve feed

The spindle sleeve feed is performed manually by actuating the spindle sleeve lever or automatically.

ATTENTION!

Danger by bumping due to the drill levers at the end of the manual or automatic drilling feed. The return spring biases and discharges the stored energy.

5.4.1 Manual spindle sleeve feed

Move the sleeve downward by means of the spindle sleeve lever. The sleeve is returned to its initial position by means of the spring force.

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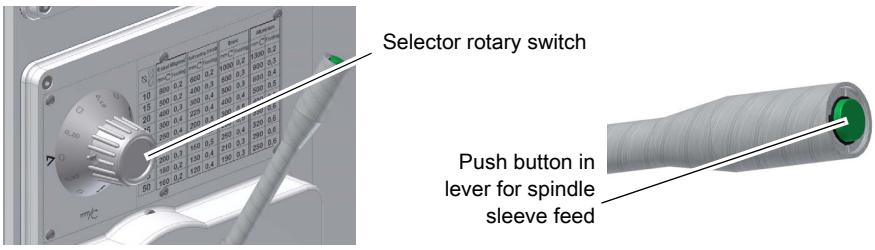
5.4.2 Automatic spindle sleeve feed

The feed is activated by pressing the push buttons in the spindle sleeve lever. The feed is performed by an electromagnetic coupling. The feed is switched off by the drilling depth stop or by pressing the push button in the spindle sleeve lever again.



Img. 5-8: Automatic spindle sleeve feed

→ Select the speed of the spindle sleeve feed actuating the selector rotary switch:

- O 0.05 mm / revolution of the spindle
- O 0.10 mm / revolution of the spindle
- O 0.15 mm / revolution of the spindle
- O 0.20 mm / revolution of the spindle
- O 0.25 mm / revolution of the spindle
- O 0.30 mm / revolution of the spindle

INFORMATION

The higher the preset number of revolutions, the greater the feed speed in the sleeve. Adjust the correct speed depending on the used material and on the drill diameter.

→ Adjust the depth stop ► Drill depth stop on page 30.

→ Press the push button in the spindle sleeve lever. The electromagnetic spindle sleeve feed is activated.

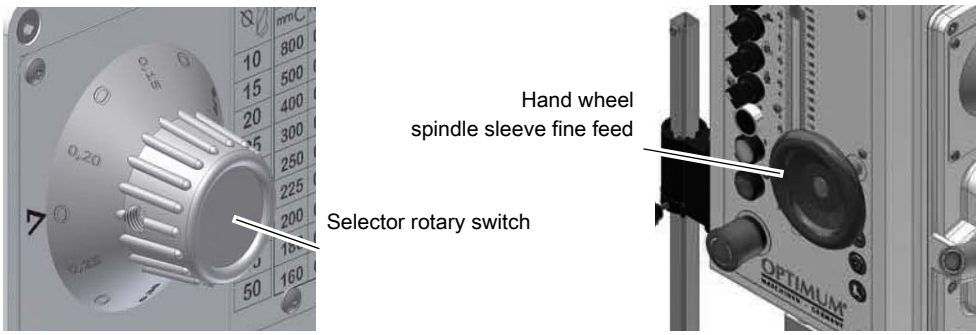
O As soon as the preset drilling depth in the drilling depth stop is attained the micro switch deactivates the drill feed. The drilling sleeve returns to the top position by spring force.

5.4.3 Handwheel for spindle sleeve fine feed

→ Turn the selection rotary switch to the "0" position.

→ Turn the handwheel in order to turn the sleeve.

→ Set the required position with the handwheel.



Img. 5-9: Spindle sleeve fine feed

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5.5 Tool holder

5.5.1 Unfitting the drill chuck

WARNING!

Perform the following work only when you have switched off and locked the main switch.

ATTENTION!

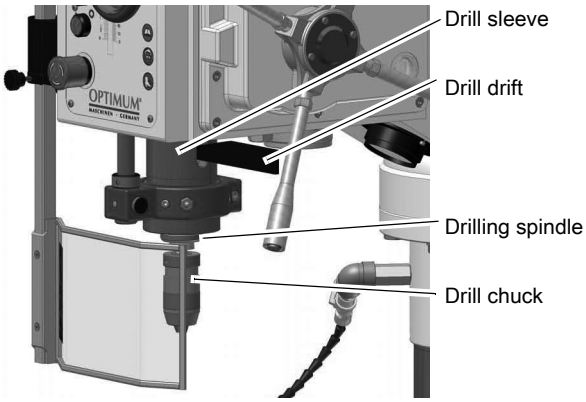
Hold the tool or drill chuck tight.

With the below described procedure the taper mandrel is being loosened from the drilling spindle. The tool and/or the drill chuck will fall down.

1 Disassembly using the drill drift

→ Turn the drilling spindle until the openings of the sleeve and of the drilling spindle are superimposed. Switch the gear selector to a higher speed level in order to facilitate the turning of the sleeve.

→ Loosen the conical chuck from the bit-holder using a drift.



Img.5-10: Drill sleeve

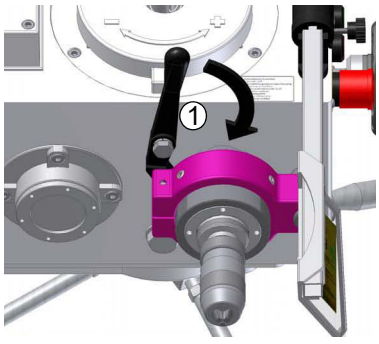
2 Disassembly with integrated drill drift

→ Move the sleeve lever ② a little downward until you can shift the lever ① to the right.

ATTENTION!

Hold the tool ③ or drill chuck tight.

With the below described procedure the taper mandrel is being loosened from the drilling spindle. The tool and/or the drill chuck will fall down.



Img.5-11: Disassembly

→ Press the spindle sleeve lever ② upward.

O The taper mandrel is pressed out of the drill spindle.

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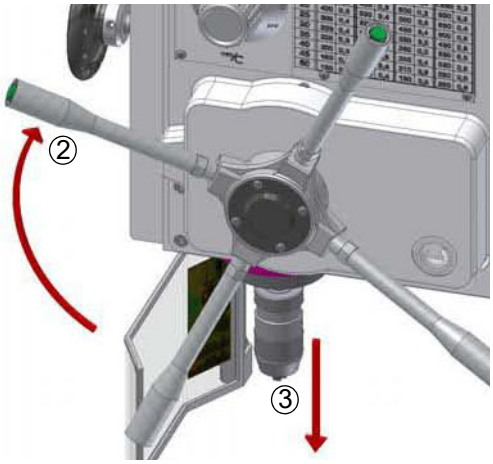


Img.5-12: Disassembly

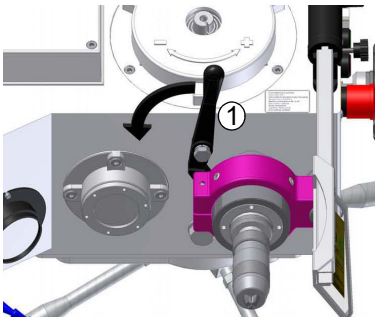
5.5.2 Fitting the drill chuck

→ Check and, if necessary, clean the conical seat in the drilling spindle and at the taper mandrel of the tool or the drill chuck.

→ Press the taper mandrel into the drilling spindle.

ATTENTION!

Shift the lever ① to the left to its initial position. The tool and / or the drill chuck will fall down.



Img.5-13: Fitting

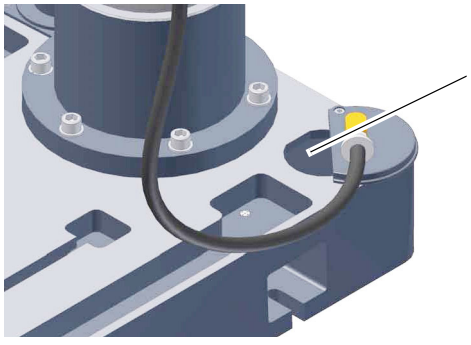
5.6 Coolant equipment

WARNING!

Ejection and overflowing of coolants and lubricants. Make sure you do not get the cooling lubricants on the floor. Spilled on the floor cooling agents must be removed immediately.

Due to friction heat caused by the rotation movement high temperatures are generated on the cutting edge of the tool.

Cool down the tool while drilling. In this way you attain better working results and a longer durability of the tools.



Img.5-14: Filler hole

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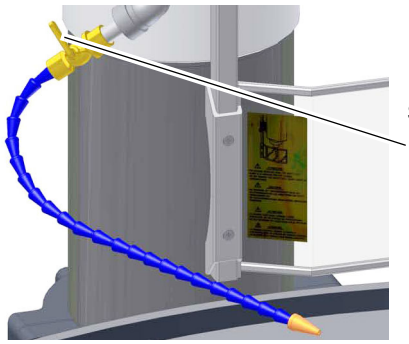

Img.5-15: Coolant shut-off tap and doser

→ Adjust the flow using the shut-off and dosing tap.

ATTENTION!

Failure of the pump in case of dry running.

The pump is lubricated by the cooling agent. Do not start up the pump without cooling agent.

INFORMATION

Use a water-soluble and non-pollutant oil as a cooling agent. This can be acquired from authorised distributors.

Re-use cooling agents and lubricants.

Respect the environment when disposing of any lubricants and cooling agents.

Follow the manufacturer's disposal instructions.

5.7 Working with the machine

5.7.1 Preparation

WARNING!

For drilling jobs, it is necessary to clamp the workpiece firmly to prevent the bit catching on the pieces. A machine vice or clamping claws is a suitable clamping device.

Put a wooden or plastic board beneath the workpiece to avoid drilling through to the work table, vice, etc.

If necessary, adjust the required drilling depth using the depth stop to obtain a constant result.

Please make sure to use a suitable dust suction when treating wood since wood dust may be health hazardous.

Wear a suitable dust mask when performing works at which dust is generated.

→ First, select the speed of the bit. This will depend on the diameter of the bit being used and on the material. ► Determining the cutting speed and the speed on page 36

5.8 Drilling

WARNING!

Seizing of clothes and / or hair.

- **Make sure to wear well-fitting work during drilling work.**
- **Do not use gloves.**
- **If necessary, use a hairnet.**

CAUTION!

Risk of crushing!

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Do not grap between the drill head and the sleeve. Risk of crushing due to the sleeve lever. The sleeve is reset by means of a recuperation spring. Do not release the spindle sleeve when resetting the spindle.

Spindle sleeve lever

→ Evenly actuate the sleeve feed when feeding the sleeve manually but not too forcefully.

5.8.1 Drill bit

→ Thin drill bits easily break. In the case of deep drilling, remove the bit from time to time to remove filings from the drill.

Cooling lubricants reduce the friction and increase the service life of the drill bit.

6 Determining the cutting speed and the speed

6.1 Table cutting speeds / infeed

Material table						
Material to be processed	Recommended cutting speed **Vc** in m/min	Recommended infeed **f** in mm/revolution				
		Drill bit diameter **d** in mm				
		2...3	>3...6	>6...12	>12...25	>25...50
Unalloyed construction steels < 700 N/mm²	30 - 35	0.05	0.10	0.15	0.25	0.35
Alloyed construction steels > 700 N/mm²	20 - 25	0.04	0.08	0.10	0.15	0.20
Alloyed steels < 1000 N/mm²	20 - 25	0.04	0.08	0.10	0.15	0.20
Steels, low stability < 800 N/mm²	40	0.05	0.10	0.15	0.25	0.35
Steel, high stability > 800 N/mm²	20	0.04	0.08	0.10	0.15	0.20
non-rust steels > 800 N/mm²	12	0.03	0.06	0.08	0.12	0.18
Cast iron < 250 N/mm²	15 - 25	0.10	0.20	0.30	0.40	0.60
Cast iron > 250 N/mm²	10 - 20	0.05	0.15	0.25	0.35	0.55
CuZn alloy brittle	60 - 100	0.10	0.15	0.30	0.40	0.60
CuZn alloy ductile	35 - 60	0.05	0.10	0.25	0.35	0.55
Aluminium alloy up to 11% Si	30 - 50	0.10	0.20	0.30	0.40	0.60
Thermoplastics	20 - 40	0.05	0.10	0.20	0.30	0.40
Thermosetting materials with organic filling	15 - 35	0.05	0.10	0.20	0.30	0.40
Thermosetting materials with an-organic filling	15 - 25	0.05	0.10	0.20	0.30	0.40

6.2 Speed table

Vc in m/min	4	6	8	10	12	15	18	20	25	30	35	40	50	60	80	100
Drill bit **Ø** in mm	Speed **n** in rpm															
1,0	1274	1911	2548	3185	3822	4777	5732	6369	7962	9554	11146	12739	15924	19108	25478	31847
1,5	849	1274	1699	2123	2548	3185	3822	4246	5308	6369	7431	8493	10616	12739	16985	21231
2,0	637	955	1274	1592	1911	2389	2866	3185	3981	4777	5573	6369	7962	9554	12739	15924

Drilling_VC_GB.fm

2,5	510	764	1019	1274	1529	1911	2293	2548	3185	3822	4459	5096	6369	7643	10191	12739
3,0	425	637	849	1062	1274	1592	1911	2123	2654	3185	3715	4246	5308	6369	8493	10616
3,5	364	546	728	910	1092	1365	1638	1820	2275	2730	3185	3640	4550	5460	7279	9099
4,0	318	478	637	796	955	1194	1433	1592	1990	2389	2787	3185	3981	4777	6369	7962
Vc in m/min	4	6	8	10	12	15	18	20	25	30	35	40	50	60	80	100
Drill bit **Ø** in mm	Speed **n** in rpm															
4,5	283	425	566	708	849	1062	1274	1415	1769	2123	2477	2831	3539	4246	5662	7077
5,0	255	382	510	637	764	955	1146	1274	1592	1911	2229	2548	3185	3822	5096	6369
5,5	232	347	463	579	695	869	1042	1158	1448	1737	2027	2316	2895	3474	4632	5790
6,0	212	318	425	531	637	796	955	1062	1327	1592	1858	2123	2654	3185	4246	5308
6,5	196	294	392	490	588	735	882	980	1225	1470	1715	1960	2450	2940	3920	4900
7,0	182	273	364	455	546	682	819	910	1137	1365	1592	1820	2275	2730	3640	4550
7,5	170	255	340	425	510	637	764	849	1062	1274	1486	1699	2123	2548	3397	4246
8,0	159	239	318	398	478	597	717	796	995	1194	1393	1592	1990	2389	3185	3981
8,5	150	225	300	375	450	562	674	749	937	1124	1311	1499	1873	2248	2997	3747
9,0	142	212	283	354	425	531	637	708	885	1062	1238	1415	1769	2123	2831	3539
9,5	134	201	268	335	402	503	603	670	838	1006	1173	1341	1676	2011	2682	3352
10,0	127	191	255	318	382	478	573	637	796	955	1115	1274	1592	1911	2548	3185
11,0	116	174	232	290	347	434	521	579	724	869	1013	1158	1448	1737	2316	2895
12,0	106	159	212	265	318	398	478	531	663	796	929	1062	1327	1592	2123	2654
13,0	98	147	196	245	294	367	441	490	612	735	857	980	1225	1470	1960	2450
14,0	91	136	182	227	273	341	409	455	569	682	796	910	1137	1365	1820	2275
15,0	85	127	170	212	255	318	382	425	531	637	743	849	1062	1274	1699	2123
16,0	80	119	159	199	239	299	358	398	498	597	697	796	995	1194	1592	1990
17,0	75	112	150	187	225	281	337	375	468	562	656	749	937	1124	1499	1873
18,0	71	106	142	177	212	265	318	354	442	531	619	708	885	1062	1415	1769
19,0	67	101	134	168	201	251	302	335	419	503	587	670	838	1006	1341	1676
20,0	64	96	127	159	191	239	287	318	398	478	557	637	796	955	1274	1592
21,0	61	91	121	152	182	227	273	303	379	455	531	607	758	910	1213	1517
22,0	58	87	116	145	174	217	261	290	362	434	507	579	724	869	1158	1448
23,0	55	83	111	138	166	208	249	277	346	415	485	554	692	831	1108	1385
24,0	53	80	106	133	159	199	239	265	332	398	464	531	663	796	1062	1327
25,0	51	76	102	127	153	191	229	255	318	382	446	510	637	764	1019	1274
26,0	49	73	98	122	147	184	220	245	306	367	429	490	612	735	980	1225
27,0	47	71	94	118	142	177	212	236	295	354	413	472	590	708	944	1180
28,0	45	68	91	114	136	171	205	227	284	341	398	455	569	682	910	1137
29,0	44	66	88	110	132	165	198	220	275	329	384	439	549	659	879	1098
30,0	42	64	85	106	127	159	191	212	265	318	372	425	531	637	849	1062
31,0	41	62	82	103	123	154	185	205	257	308	360	411	514	616	822	1027
32,0	40	60	80	100	119	149	179	199	249	299	348	398	498	597	796	995
33,0	39	58	77	97	116	145	174	193	241	290	338	386	483	579	772	965
34,0	37	56	75	94	112	141	169	187	234	281	328	375	468	562	749	937

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35,0	36	55	73	91	109	136	164	182	227	273	318	364	455	546	728	910
36,0	35	53	71	88	106	133	159	177	221	265	310	354	442	531	708	885
37,0	34	52	69	86	103	129	155	172	215	258	301	344	430	516	689	861
38,0	34	50	67	84	101	126	151	168	210	251	293	335	419	503	670	838
Vc in m/min	4	6	8	10	12	15	18	20	25	30	35	40	50	60	80	100
Drill bit **Ø** in mm	Speed **n** in rpm															
39,0	33	49	65	82	98	122	147	163	204	245	286	327	408	490	653	817
40,0	32	48	64	80	96	119	143	159	199	239	279	318	398	478	637	796
41,0	31	47	62	78	93	117	140	155	194	233	272	311	388	466	621	777
42,0	30	45	61	76	91	114	136	152	190	227	265	303	379	455	607	758
43,0	30	44	59	74	89	111	133	148	185	222	259	296	370	444	593	741
44,0	29	43	58	72	87	109	130	145	181	217	253	290	362	434	579	724
45,0	28	42	57	71	85	106	127	142	177	212	248	283	354	425	566	708
46,0	28	42	55	69	83	104	125	138	173	208	242	277	346	415	554	692
47,0	27	41	54	68	81	102	122	136	169	203	237	271	339	407	542	678
48,0	27	40	53	66	80	100	119	133	166	199	232	265	332	398	531	663
49,0	26	39	52	65	78	97	117	130	162	195	227	260	325	390	520	650
50,0	25	38	51	64	76	96	115	127	159	191	223	255	318	382	510	637

6.2.1 Example for calculating the required speed on your drilling machine

The necessary speed is depending on the diameter of the drill bit, on the material which is being machined as well as on the cutting material of the drill bit.

Material which needs to be drilled: St37

Cutting material (drill bit): HSS spiral bit

Set point of the cutting speed [V_c] according to the table: 40 meters per minute

Diameter [d] of your drill bit: 30 mm = 0.03 m [meters]

Selected infeed [f] according to the table: about 0.35 mm/rev

$$\text{Speed } n = \frac{Vc}{\pi \times d} = \frac{40m}{\text{min} \times 3.14 \times 0.03m} = 425 \text{ rpm}$$

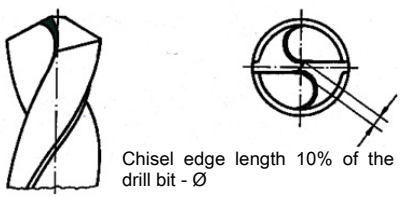
Set a speed on your drilling machine which is less than the determined speed.

INFORMATION

In order to facilitate the production of larger drill holes they need to be pre-drilled. This way, you reduce the cutting forces and improve the guiding of the drill bit.

The pre-drilling diameter is depending on the length of the chisel edge. The chisel edge does not cut, but it squeezes the material. The chisel edge is positioned at an angle of 55° to the major cutting edge.

As a general rule of thumb it applies: The pre-drilling diameter is depending on the length of the chisel edge.



Chisel edge length 10% of the drill bit - Ø

Recommended working steps for a drilling diameter of 30 mm

Example: 1st working step: Pre-drilling with Ø 5 mm. 2nd working step: Pre-drilling with Ø 15 mm. 3rd working step: Drilling with Ø 30 mm.

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7 Maintenance

In this chapter you will find important information about

- Inspection
- Maintenance
- Repairs

ATTENTION!

Properly performed regular maintenance is an essential prerequisite for

- **operational safety,**
- **failure-free operation,**
- **long service life of the machine and**
- **the quality of the products which you manufacture.**

Installations and equipment from other manufacturers must also be in good order and condition.

ENVIRONMENTAL PROTECTION

During work on the spindle head, please make sure that

- **collector tanks are used with sufficient capacity for the amount of liquid to be collected.**
- **liquids and oils should not be split on the ground.**

Clean up any spilt liquid or oils immediately using proper oil-absorption methods and dispose of them in accordance with current legal requirements on the environment.

Collect leakages

Do not re-introduce liquids split outside the system during repair or as a result of leakage from the reserve tank:collect them in a collecting container to be disposed of.

Disposal

Never dump oil or other substances which are harmful for the environment in water inlets, rivers or channels.

Used oils must be delivered to a collection centre. Consult your supervisor if you do not know where the collection centre is.

7.1 Safety

WARNING!

The consequences of incorrect maintenance and repair work may include:

- **very serious injury to personnel working on the machine,**
- **damage to the machine.**

Only qualified staff should carry out maintenance and repair work on the machine.

Validation

Check and maintain all safety-relevant stop, control and measuring devices (validation).

Documentation

Record all tests and works in a operator's log resp. log book.

7.1.1 Preparation

WARNING!

Only carry out work on the machine if it has been unplugged from the mains power supply. ► Disconnecting and securing the geared drill. on page 15

Attach a warning sign.

7.1.2 Restarting

Before restarting run a safety check.

► Safety check on page 13

WARNING!

Before starting the machine you must be sure that

- **no dangers generated for persons,**
- **the machine is not damaged.**

7.2 Inspection and maintenance

The type and level of wear depends to a large extent on the individual usage and operating conditions. For this reason, all the intervals are only valid for the authorised conditions.

Interval	Where?	What?	How?
Start of shift after every maintenance or repair work	Clean machine	► Safety check on page 13	

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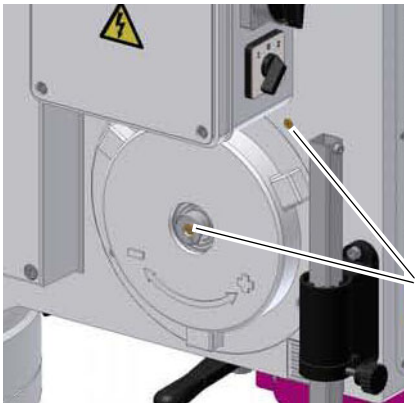
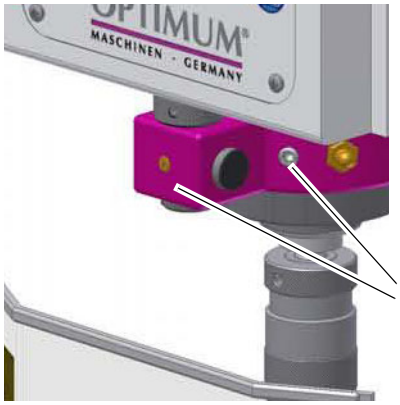
<table>
<tr><th>Interval</th><th>Where?</th><th>What?</th><th>How?</th></tr>
<tr><td rowspan="2">every day</td><td rowspan="2">Drill head, spindle sleeve, drill table support</td><td rowspan="2">Lubricating</td><td>→ Lubricate the lubricating nipples with oil.
 

Img. 7-1: Lubricating nipple drill head</td></tr>
<tr><td>→ Lubricate the lubricating nipples with oil.
 

Img. 7-2: Lubrication nipple spindle sleeve and drilling table support</td></tr>
</table>

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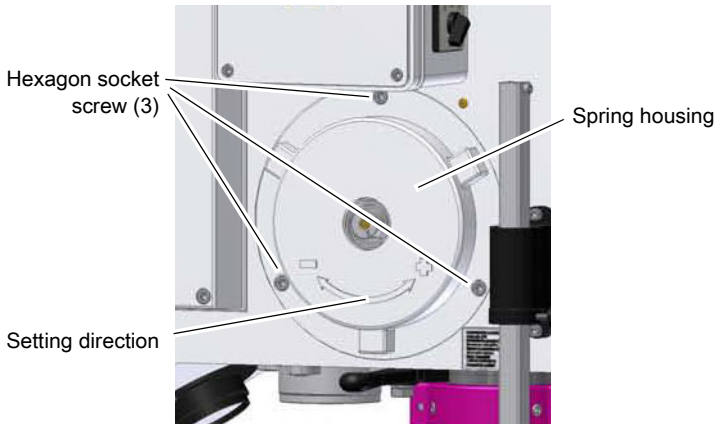
Interval	Where?	What?	How?
as required	Spindle return spring	Readjusting	**ATTENTION!** **Parts can be flung towards you. When disassembling the key housing, please make sure that the machine is only maintained and prepared by qualified staff.** If required, re-adjust the spindle return spring. → Loosen the hexagon socket screws (3) on the spring housing. → Turn the spring housing in direction "+" by one screw turn. → Retighten the hexagon socket screws (3). → The pretension be set depends on the maximum used tool weight. Check the setting with the heaviest tool and adjust if necessary.  Img. 7-3: Spring housing

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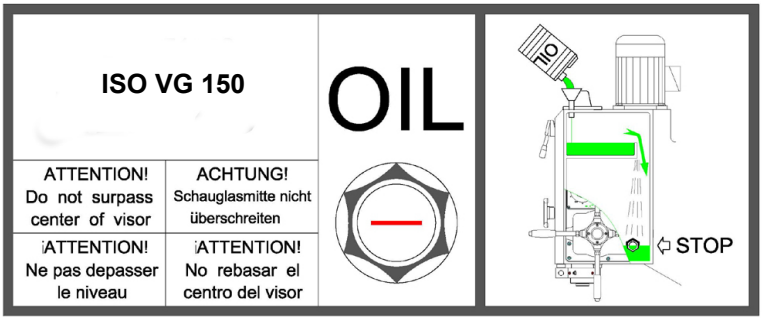
Interval	Where?	What?	How?
at the beginning of the shift after every maintenance or repair work	Drill head	Oil level of the gear of the drilling spindle sleeve	→ Check the oil level in the inspection glass The glass oil level (deposed) should be half-covered.
			→ Fill in in the open gear lubrication system of the drill about 2.5 litres of oil. → Switch on the geared drill. → Check the oil level in the inspection glass The sight glass (oil level dropped) should be set up to be half covered.

Img. 7-4: Oil level of the gear of the drilling spindle sleeve

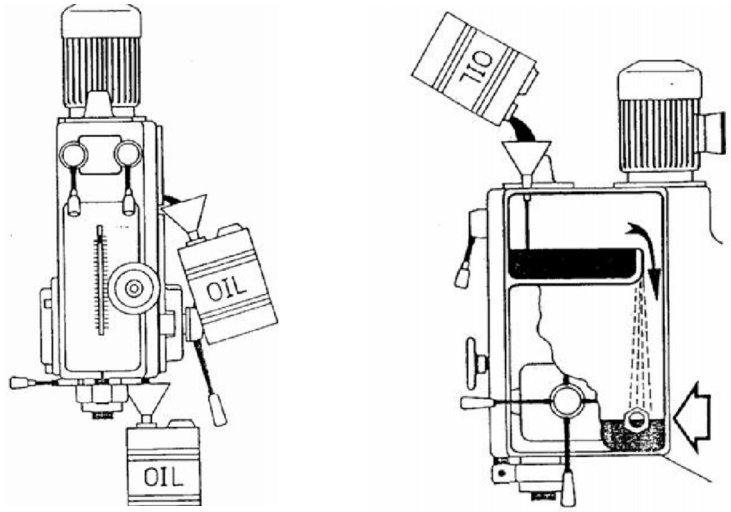


Img. 7-5: Functional diagram of the lubrication system

ATTENTION!

The geared drill is delivered without operating material (oil, coolant). Fill in first oil and coolant before commissioning.

Fill the gearbox with gear oil.

Interval	Where?	What?	How?
First after 200 operatingm hours, then every 2000 operating hours	Drill head	Changing the oil in the gear of the drilling spindle sleeve	→ For oil change use an appropriate collecting tray of sufficient capacity. → Unscrew the screw from the drain hole. Img.7-6: Oil drain plug  Img.7-7: Changing the oil in the gear of the drilling spindle sleeve → Re-fill the gear with gear oil. Approx. consumption 2.5 litres. Pay attention to the correct level. ► Operating material on page 18 ► original parts or series components expressly authorized by Optimum Maschinen Germany GmbH. on page 46

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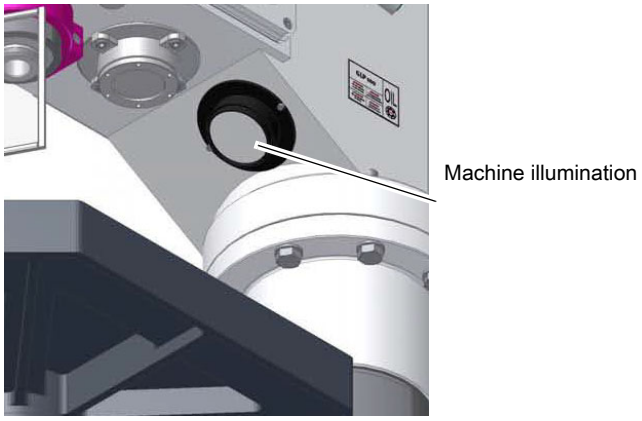
Interval	Where?	What?	How?
every month	Drill column and toothed rack	Oiling / greasing	→ Oil the drilling column in regular intervals using standard oil. → Lubricate the toothed rack in regular intervals using standard grease. ► original parts or series components expressly authorized by Optimum Maschinen Germany GmbH. on page 46
	Spur rack Drill sleeve		→ Oil the toothed rack (toothing) and the drill sleeve in regular intervals using standard oil.
as required	Coolant equipment	Coolant pump	The coolant pump is maintenance-free. → Replace the cooling agent regularly, depending on usage. → Rinse the coolant pump if you use coolants that leave residues.
as required	Illumination	Changing the bulb	If the light bulb is defective: → Unscrew the glass cover of the machine illumination. → Unscrew the light bulb by turning it to the left and by slightly pressing the bulb into the socket (bayonet). → Replace the light bulb. → Screw the glass cover onto the machine illumination.  Img.7-8: Machine illumination
at least annually	Cooling lubricant system	Replace Clean Disinfect	► Cooling lubricants and tanks on page 47 ► Inspection plan for water-mixed cooling lubricants on page 48

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Interval	Where?	What?	How?
based on operator's empirical values in accordance with DGUV (BGV A3)	Electrical system	Electrical inspection	► Obligations of the operating company on page 10 ► Electrical system on page 16 ► Validation on page 39

7.3 Repair

7.3.1 Customer service technician

Request the assistance of an authorised customer service technician for any repair work. Contact your specialist dealer if you do not have the contact details for the customer service team or contact Stürmer Maschinen GmbH in Germany who can provide you with the contact information for a specialist dealer. Optionally, the

Stürmer Maschinen GmbH

Dr.-Robert-Pfleger-Str. 26

D- 96103 Hallstadt

can provide a customer service technician, however, the request for a customer service technician can only be made via your specialist dealer.

If the repairs are carried out by qualified technical personnel, they must follow the indications given in these operating instructions.

Optimum Maschinen Germany GmbH accepts no liability nor does it guarantee against damage and operating malfunctions resulting from failure to observe these operating instructions.

For repairs only use

- O faultless and suitable tools,
- O original parts or series components expressly authorized by Optimum Maschinen Germany GmbH.

7.4 Cooling lubricants and tanks

CAUTION!

The cooling lubricant can cause diseases. Avoid direct contact with cooling lubricant or parts covered in cooling lubricant.

Cooling lubricant circuits and tanks for water-cooling lubricant mixtures must be completely emptied, cleaned and disinfected as needed, but at least once per year or every time the cooling lubricant is replaced.

If fine chips and other foreign matters are accumulated in the coolant tank, the machine can no longer be correctly supplied with coolant. Furthermore, the lifetime of the coolant pump is reduced.

When processing cast iron or similar materials generating fine chips, cleaning the coolant tank more often is recommended.

Limit values

The cooling lubricant must be replaced, the cooling lubricant circuit and tank emptied, cleaned and disinfected if

- the pH value drops by more than 1 based on the value during initial filling. The maximum permissible pH value during initial filing is 9.3
- there is a perceivable change in the appearance, odour, floating oil or increase of the bacteria to more than 10/6/ml
- there is an increase in nitrite content to more than 20 ppm (mg/1) or nitrate content to more than 50 ppm (mg/1)
- there is an increase in the N-nitrosodiethanolamine (NDELA) to more than 5 ppm (mg/a)

CAUTION!

Comply with the manufacturer's specifications for mixture ratios, hazardous substances, e.g. system cleaners, including their permissible minimum use times.

CAUTION!

Since the cooling lubricant escapes under high pressure, pumping out the coolant by using the existing cooling lubricant pump via a pressure hose into a suitable tank is not recommended.

ENVIRONMENTAL PROTECTION

During work on the cooling lubricant equipment please make sure that

- **collector tanks are used with sufficient capacity for the amount of liquid to be collected.**
- **liquids and oils should not be spilled on the ground.**

Clean up any spilled liquid or oils immediately using proper oil-absorption methods and dispose of them in accordance with current statutory environmental regulations.

Collect leakages

Do not re-introduce liquids spilled outside the system during repair or as a result of leakage from the reserve tank, instead collect them in a collecting container for disposal.

Disposal

Never dump oil or other substances which are harmful to the environment into water inlets, rivers or channels. Used oils must be delivered to a collection centre. Consult your supervisor if you do not know where the collection centre is.

7.4.1 Inspection plan for water-mixed cooling lubricants

Company: No.: Date: used cooling lubricant			
size to be checked	Inspection methods	Inspection intervals	Procedure and comment
noticeable changes	Appearance, odour	daily	Find and rectify causes, e.g. skim off oil, check filter, ventilate cooling lubricant system
pH value	Laboratory techniques electrometric with pH meter (DIN 51369) Local measurement method: with pH paper (Special indicators with suitable measuring range)	weekly [1)]	if pH value decreases > 0.5 based on initial filing: Measures in accordance manufacturer's recommendations > 1.0 based on initial filing: Replace cooling lubricant, clean cooling lubricant circulation system
Usage concentration	Manual refractometer	weekly [1)]	Method results in incorrect values with tramp oil content
Base reserve	Acid titration in accordance with Manufacturer's recommendation	as required	Method is independent of tramp oil content
Nitrite content	Test sticks method or laboratory method	weekly [1)]	> 20 mg/L nitrite: Replace cooling lubricant or part or inhibiting additives; otherwise NDELA (N-nitrosodiethanolamine) in the cooling lubricant system and in the air must be determined > 5 mg/L NDELA in the cooling lubricant system: Replacement, clean and disinfect cooling lubricant circulation system, find nitrite source and, if possible, rectify.
Nitrate/nitrite content of the preparation water, if this is not removed from the public grid	Test sticks method or laboratory method	as required	Use water from the public grid if there is water from the pubic grid has > 50 mg/l nitrate: Inform the waterworks

[1)] The specified inspection intervals (frequency) are based on continuous operation. Other operational conditions can result in other inspection intervals; exceptions are possible in accordance with Sections 4.4 and 4.10 of the TGS 611.

Editor:

Signature:

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8 Ersatzteile - Spare parts

8.1 Ersatzteilbestellung - *Ordering spare parts*

Bitte geben Sie folgendes an - *Please indicate the following :*

- Seriennummer - *Serial No.*
- Maschinenbezeichnung - *Machines name*
- Herstellungsdatum - *Date of manufacture*
- Artikelnummer - *Article no.*

Die Artikelnummer befindet sich in der Ersatzteilliste. *The article no. is located in the spare parts list.* Die Seriennummer befindet sich am Typschild. *The serial no. is on the rating plate.*

8.2 Hotline Ersatzteile - Spare parts Hotline

+49 (0) 951-96555 -118

ersatzteile@stuermer-maschinen.de

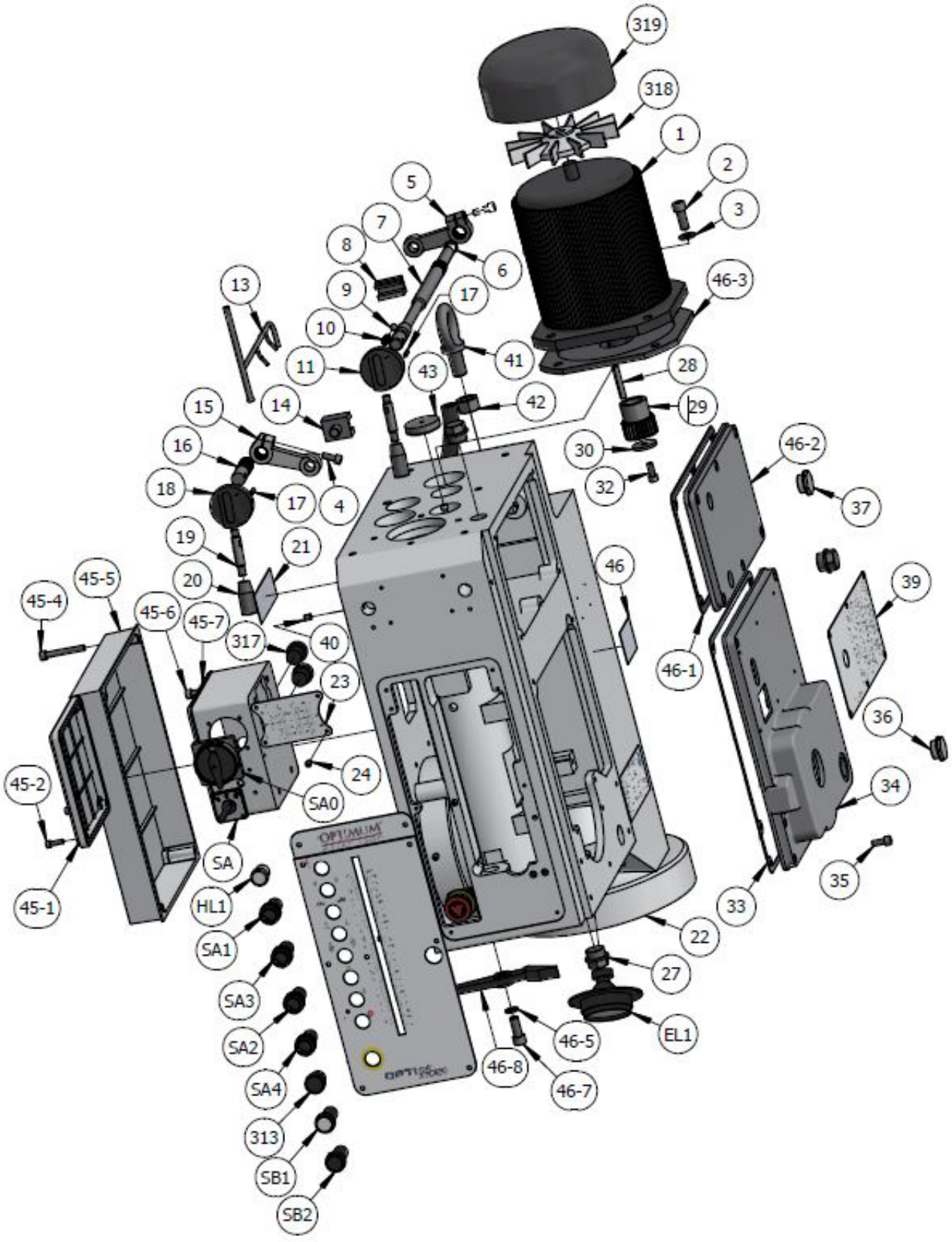
8.3 Service Hotline

+49 (0) 951-96555 -100

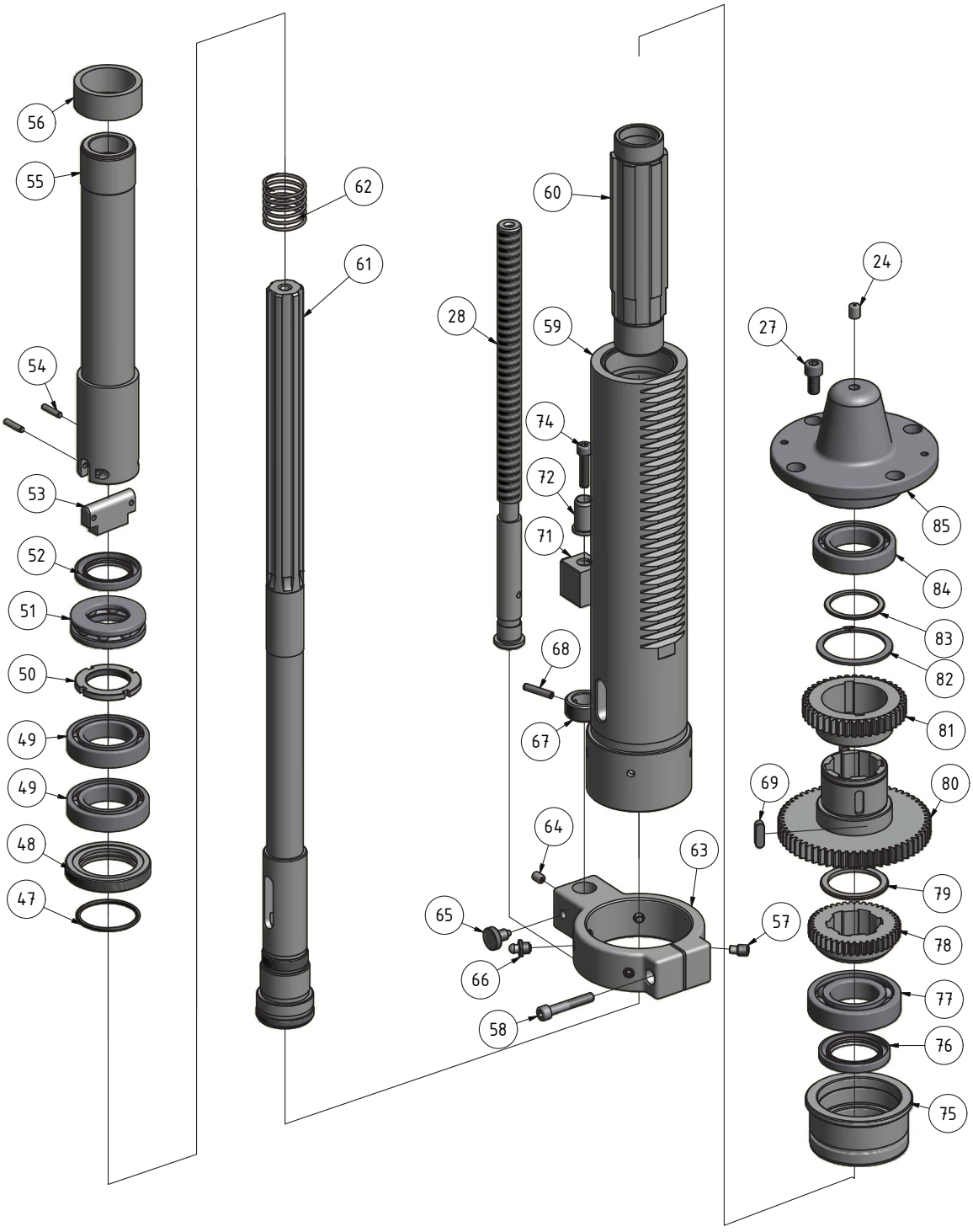
service@stuermer-maschinen.de

8.4 Ersatzteilzeichnungen - Spare part drawings

A Bohrkopf 1-7 - Drilling head 1-7



B Bohrkopf 2-7 - Drilling head 2-7



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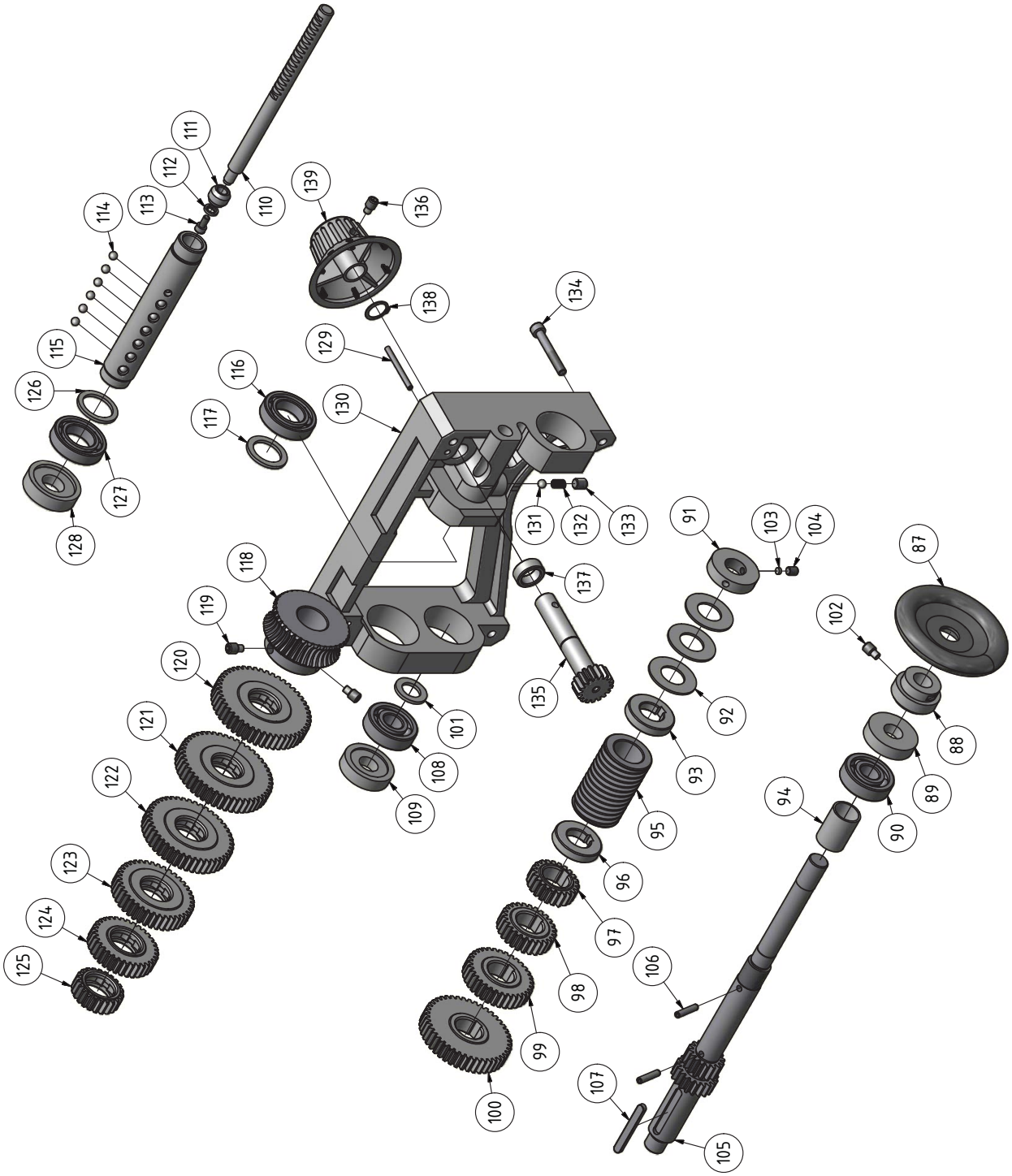
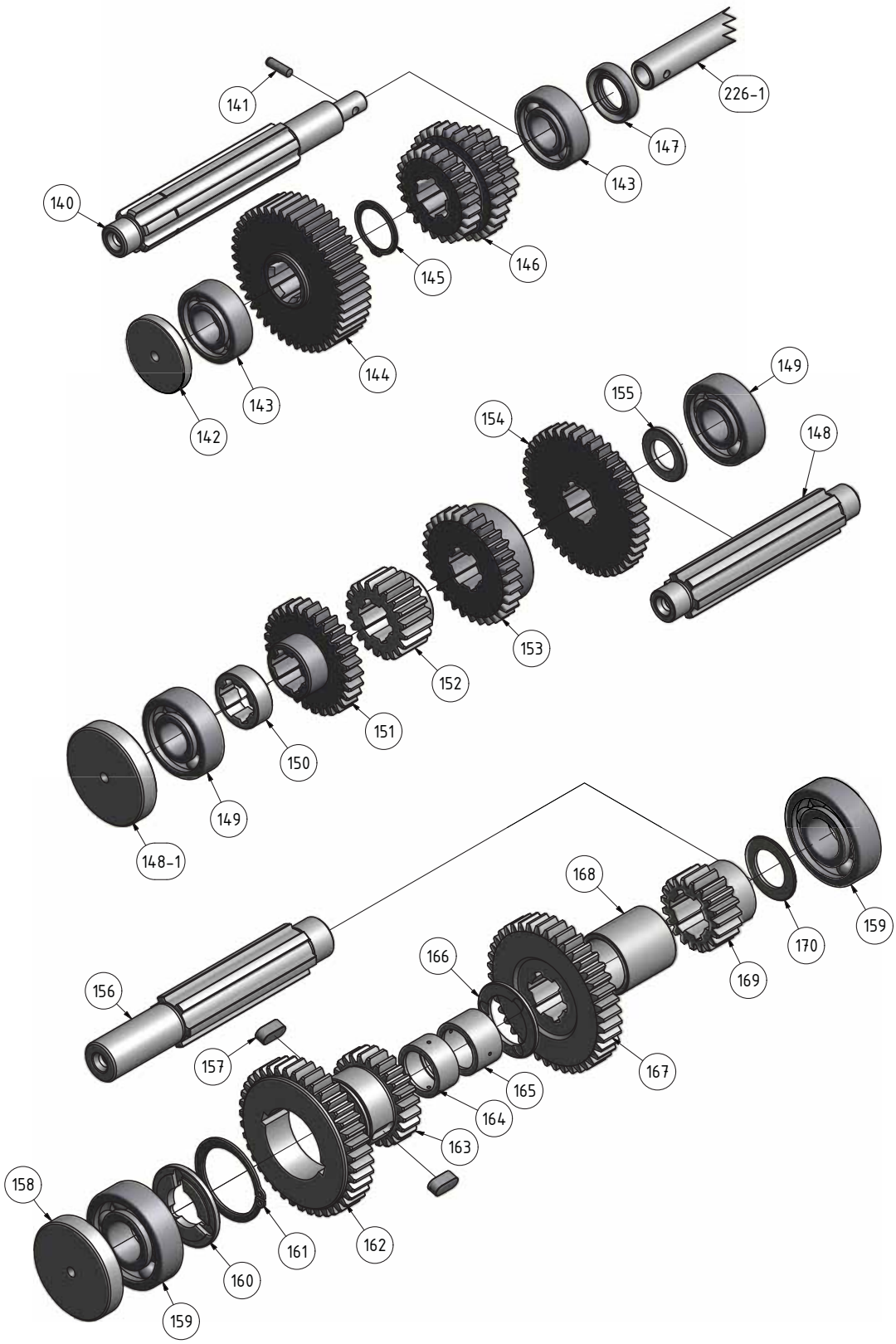
C Bohrkopf 3-7 - Drilling head 3-7

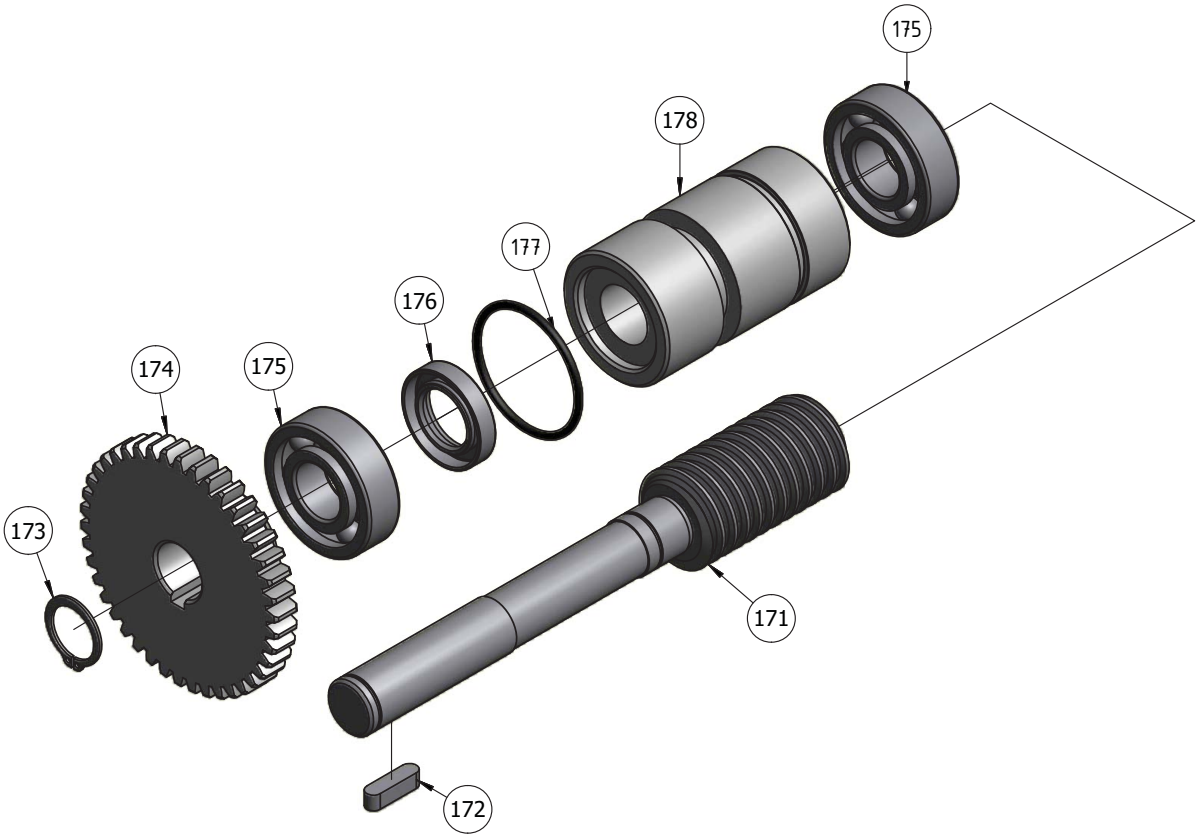


D Bohrkopf 4-7 - Drilling head 4-7



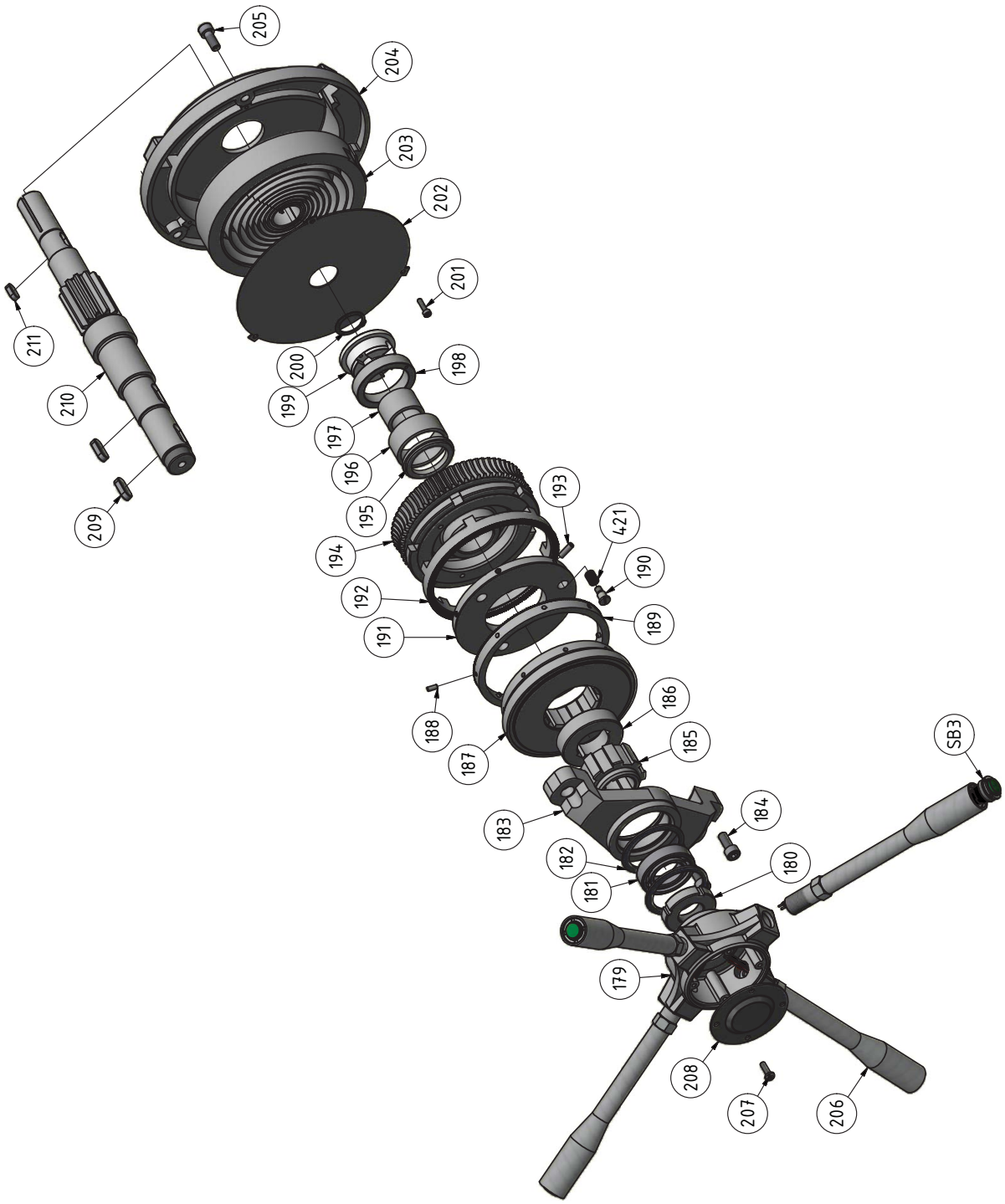
B50GSM_parts.fm

E Bohrkopf 5-7 - Drilling head 5-7



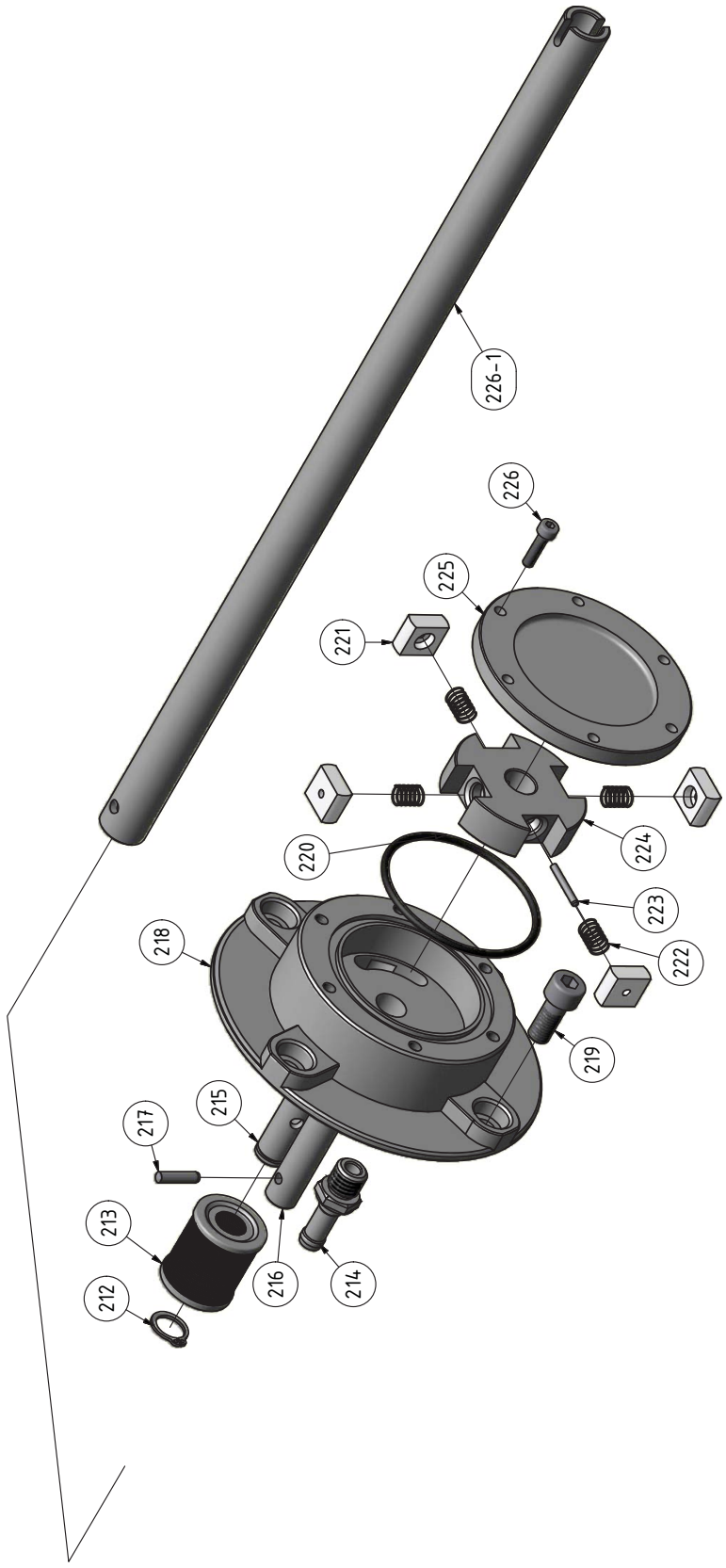
B50GSM_parts.fm

F Ersatzteilzeichnung Bohrkopf 6-7 - Sparts drawing drilling head 6-7



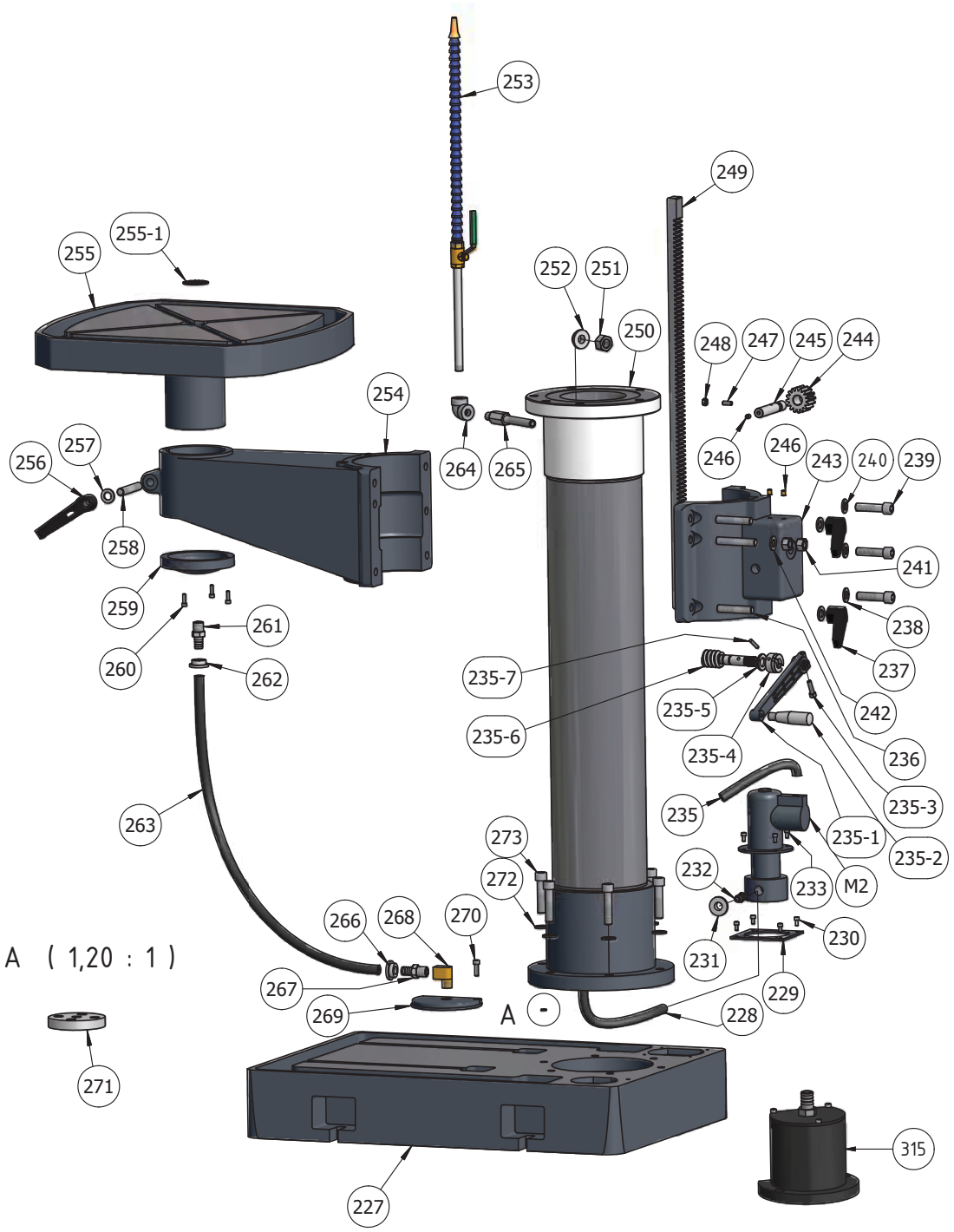
B50GSM_parts.fm

G Bohrkopf 7-7 - Drilling head 7-7

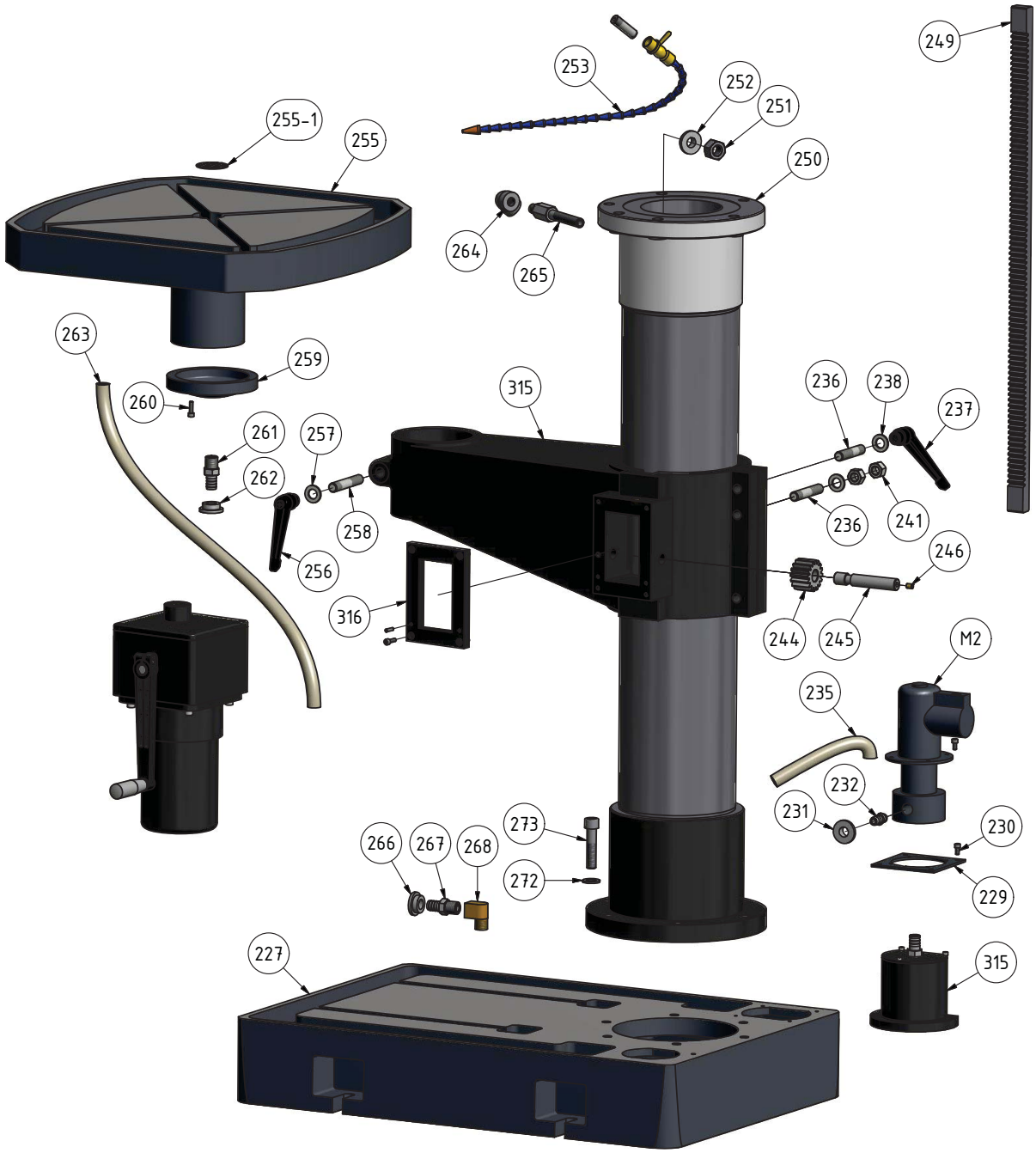


B50GSM_parts.fm

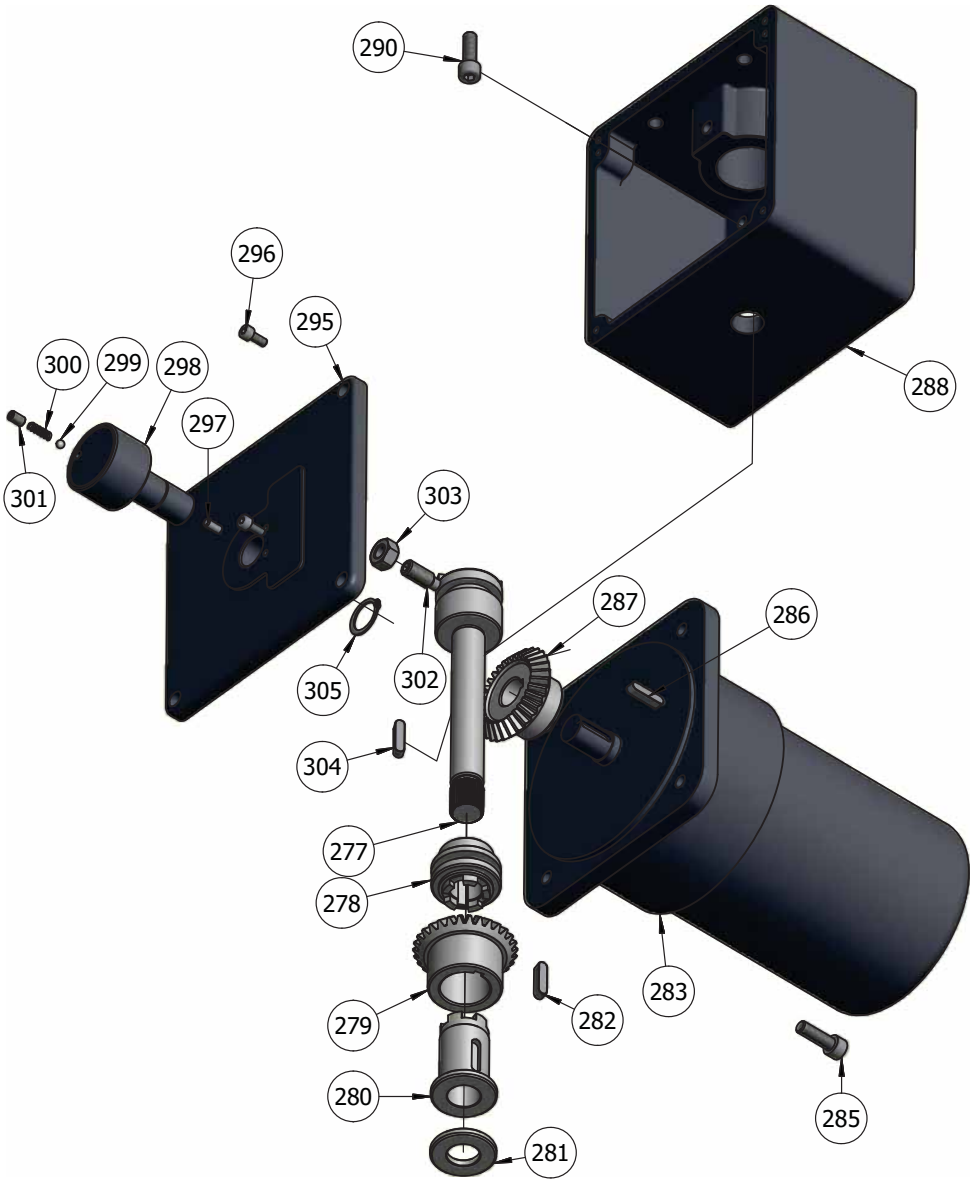
H Säule und Bohrtisch 1-2 - Column and drilling table 1-2



I Säule und Bohrtisch 1-3 - Column and drilling table 1-3

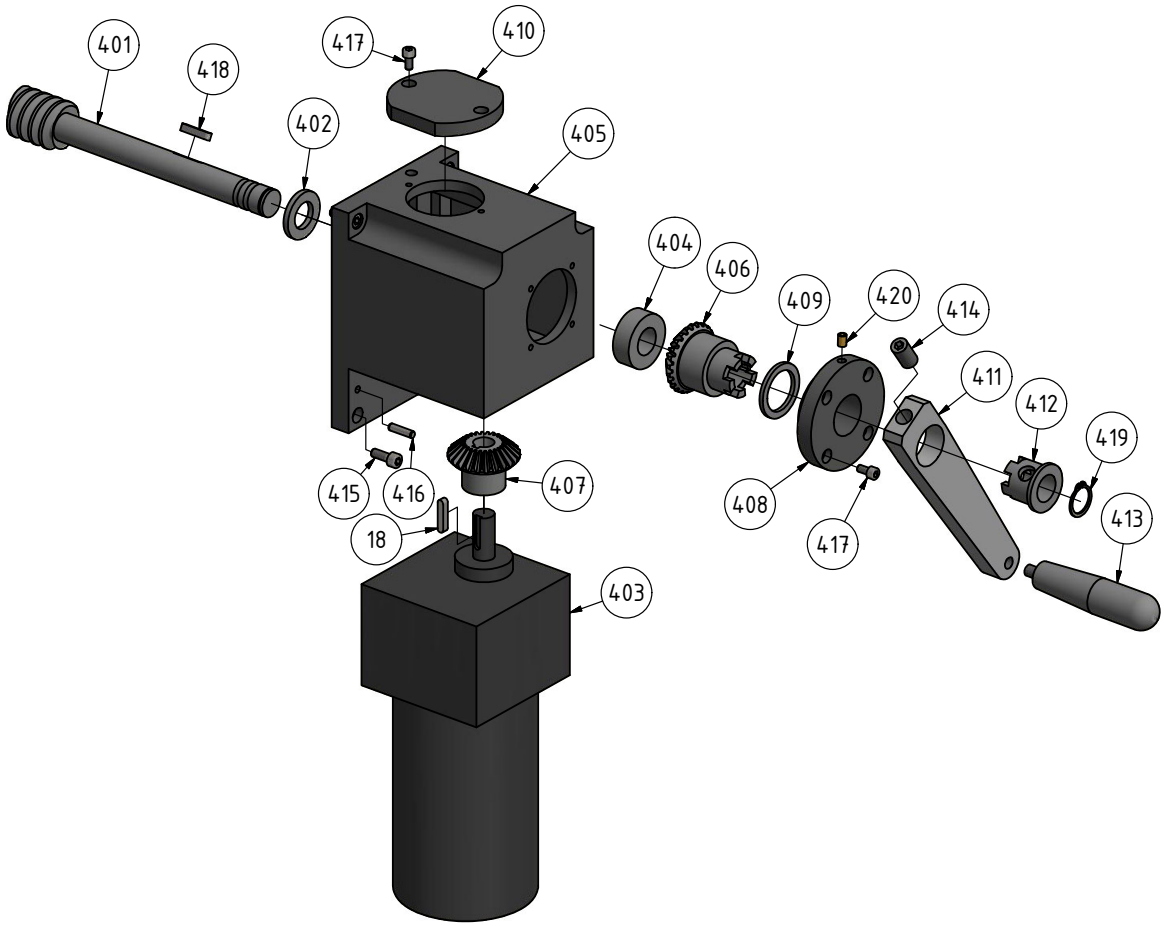


J Tischhöhenverstellung 2-3 - Table height adjustment 2-3, Version 1.0



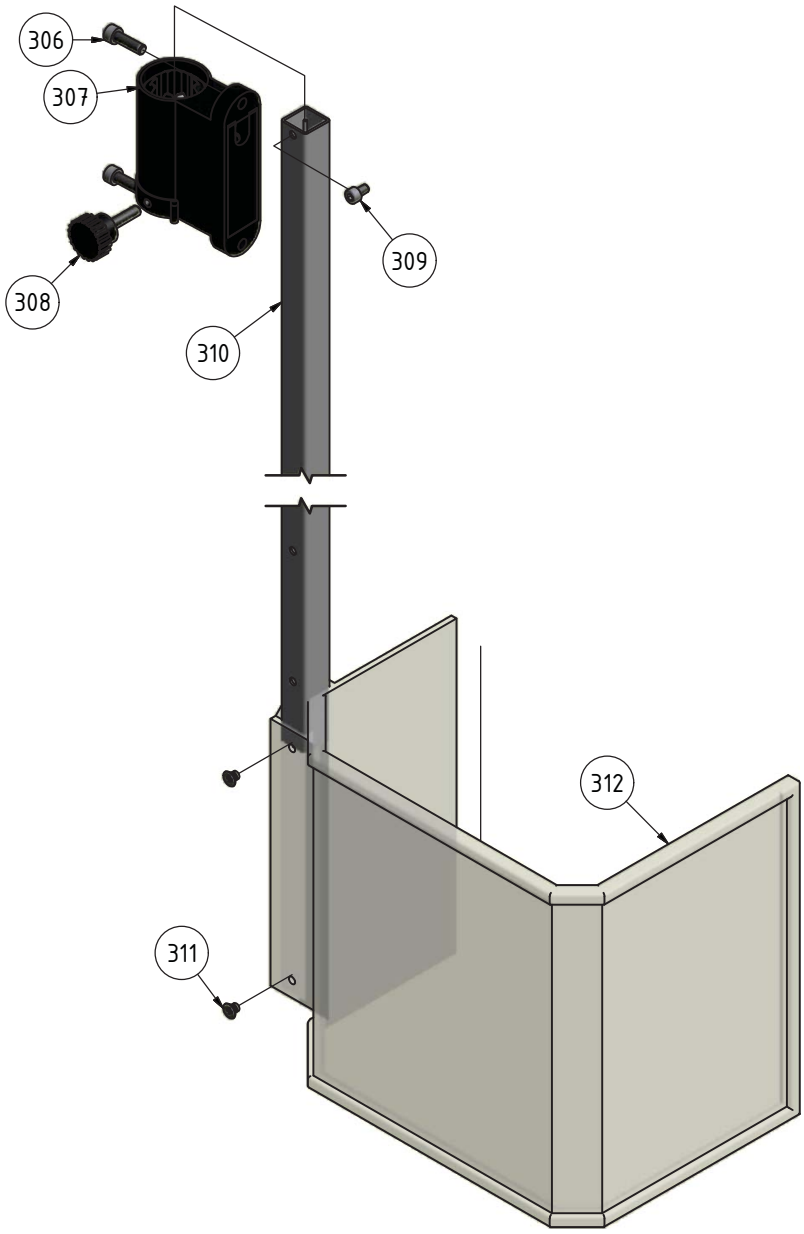
B50GSM_parts.fm

K Tischhöhenverstellung 3-3 - Table height adjustment 3-3, Version 1.1



B50GSM_parts.fm

L Schutzeinrichtung - Protection device



B50GSM_parts.fm

8.4.1 Teileliste - Parts list

B50GSM - Ersatzteilliste - Spare part list						
Pos.	**Bezeichnung**	**Description**	**Menge Qty.**	**Zeichnungsnr. Drawing no.**	**Grösse Size**	**Artikelnummer Item no.**
2	Innensechskantschraube	Socket head screw	4	GB5783-86	M12×30	
3	Unterlegscheibe	Washer	4	GB97.1-86	12	
4	Innensechskantschraube	Socket head screw	1	GB70-85	M8×25	
5	Schaltarm rechts	Right Rock Arm	1	Z5050-03-48	2G200-400	
6	Blindstopfen	Blind Plug	1	Z5050-03-49		0303450306
7	Welle	Shaft	1	Z5050-03-46		0303450307
8	Verschiebegabel rechts	Right Fork	1	Z5050-03-47	QT400-18	0303450308
9	Kugel	Ball	2	GB308-84	10	042KU10
10	Druckfeder	Compression Spring	2	GB2089-80	1×9×18	03334400194
11	Schaltarm rechts	Right Handle Support	1	Z5050-03-45		03334400192
12	Kegelstift	Taper pin	2	Z5035-02-39		03334400189
13	Schmierung Rohr Zufuhr-Kasten	Feed Case Lubrication Pipe	1	Z5050-03-54		0303450313
14	Verschiebegabel links	Left Fork	1	Z5050-03-44	QT400-18	0303450314
15	Schaltarm links	Left Rock Arm	1	Z5050-03-43	2G200-400	0303450315
16	Welle	Shaft	1	Z5050-03-42		0303450316
17	Federstift	Spring Pin	2	GB879-86	5×16	
18	Schaltarm links	Left Handle Support	1	Z5050-03-41		03334400193
19	Handgriff	Handle	2	Z5035-02-42		03334400191
20	Drehknopf	Handle Sleeve	2	GB4141.14-84	BM10×50black	
22	Gehäuse Bohrkopf	Drilling head housing	1	Z5050-03-01		
23	Geschwindigkeitstabelle	Speed Board	1	Z5050-03-50		
24	Kreuzschlitzschraube	Crossed Pan Head Screw	30	GB818-85	M5×8 black	
25	Passfeder	Key	1	GB1096	8x50	
27	Verschlussstopfen	Hexagon Oil Plug	3	G38-2A	M27×2	03334403189
28	Welle	Shaft	1			0303450328
29	Zahnrad	Gear	1	Z5050-03-03	Z22 m2	0303450329
30	Endscheibe Motorachse	Motor Axle End Washer	1	Z5050-03-04	8	
31	Federring	Lock Washer	1	GB/T862.2-1987		
32	Sechskantschraube	Hexagon bolt	1	GB5783-86	M8×20	
33	Dichtung	Gasket	1	Z5050-03-52		0303450333
34	Deckel	Cover	1	Z5050-03-51		0303450334
35	Innensechskantschraube	Socket head screw	11	GB70-85	M8×20	
36	Oelschauglas	Oil glass	1	GB1160.2-86	B20	0343143
37	Aluminium Oelschauglas	Aluminum Oil glass	1	WG-Z5035-02	M27×1.5	03334400178
38	Flexibler Schlauch	Flexible tube	1		M24×1.5	0303450338
39	Gewindestift	Setscrew	2	GB79-86	M8×16	
40	Gewindestift	Setscrew	2	GB77-86	M8×10	
41	Ringschraube	Eye Bolt	1	GB825-88	BM20	
42	Sechskantmutter	Hexagon nut	1	GB6170-86	M20	
43	Endstöpsel	End Cap	1	Z5050-03-36		
45	Niet	Rivet	4	GB827-86	2×5	0340116
45-1	Deckel	Cover	1	Z5050-04-06		03034503451
45-2	Innensechskantschraube	Socket head screw	4	GB70-85	M6x20	
45-4	Innensechskantschraube	Socket head screw	4	GB70-85	M8×60	
45-5	Deckel	Cover	1	Z5050-04-13		03034503455
45-6	Innensechskantschraube	Socket head screw	4	GB70-85	M8×12	
45-7	Gehäuse	Box	1	Z5050-04-05		03034503457
46	Oeltabelle	Oiling Board	1	Z5050-03-128		
46-1	Dichtung	Gasket	1	Z5050-03-52		03034503461
46-2	Deckel	Cover	1	Z5050-03-51		03034503462
46-3	Flansch Motor	Flange motor	1	Z5050-03-131		
46-5	Federring	Lock Washer	1	GB/T862.2-1987	12	
46-7	Sechskantschraube	Hexagon bolt	1	GB5783-86	12×30	
46-8	Hebel	Lever		Z5050-03-59		03034503468
47	Dichtungsring	Sealing Ring	1	GB3452.1-82	51.5×3.55	0303450347
48	Wellendichtring	Oil seal	1	Z5050-03-111		0303450348
49	Lager	Grooved Bearing	2		6009/45×75×16	0406009R
50	Nutmutter	Groove nut	1	Z5050-03-126		
51	Kugellager	Ball Bearing	1		51208/ 40×68×19	04051208
52	Wellendichtring	Oil seal	1	GB13871-1992	40×60×8	04140608
53	Passfeder	Profile Key	1	Z5050-03-123		0303450353
54	Federstift	Spring Pin	2	GB879-86	5×24	
55	Welle	Shaft	1	Z5050-03-121		0303450355
56	Nadellager	Needle bearing	1		NK 50/25-50x62x25	040NK5025
57	Madenschraube	Grub screw	4	Z5050-03-81	M10x10	0303450357
58	Innensechskantschraube	Socket head screw	1	GB70-85	M8×50	
59	Pinole	Pinole	1	Z5050-03-119		0303450359
CPL	Pinole kpl.	Pinole cpl.	1			0303450359CPL

B50GSM_parts.fm

B50GSM - Ersatzteilliste - Spare part list						
Pos.	**Bezeichnung**	**Description**	**Menge Qty.**	**Zeichnungsnr. Drawing no.**	**Grösse Size**	**Artikelnummer Item no.**
60	Welle	Shaft	1	Z5050-03-29		0303450360
61	Spindel	Spindle	1	Z5050-03-120		0303450361
62	Druckfeder	Compression Spring	1	GB2089-80	2.5×37×70	
63	Halter	Holder	1	Z5050-03-114		0303450363
64	Schmiernippel	Grease nipple	1	GB1155-79	8	0340114
65	Gewindestift	Lock Screw	1	Z5050-03-113		0303450365
66	Schmiernippel	Lubrication cup	1	Z5050-03-81		0303450366
67	Hülse	Bushing	1	Z5050-03-115		0303450367
68	Federstift	Spring Pin	1	GB879-86	6×32	
69	Passfeder	Key	2	GB1567-79	8×5×25	
70	Gewindestange	Threaded rod	1	Z5050-03-116		0303450370
71	Bohrtiefenanschlag	Drilling depth stop	1	Z5050-03-118		
72	Hülse	Bushing	1	Z5050-03-117		
73	Innensechskantschraube	Socket head screw	4	GB70-85	M10×20	
74	Innensechskantschraube	Socket head screw	1	GB70-85	M8×35	
75	Halterung-Welle	Shaft bush	1	Z5050-03-35		0303450375
76	Dichtung	Seal	1	GB13871-1992	45×65×8	04145658
77	Lager	Grooved Bearing	1		6009/ 45x75x16	0406009R
78	Zahnrad	Gear	1	Z5050-03-34	Z=42 m=2	0303450378
79	Distanzscheibe	Spacer	1	Z5050-03-33		
80	Zahnrad	Gear	1	Z5050-03-31	Z=60 m=2.25	0303450380
81	Zahnrad	Gear	1	Z5050-03-32	Z=0 m=2.25	0303450381
82	Halter-Welle	Axle retainer	1	GB894.1-86	60	042SR60W
83	Distanzscheibe	Spacer	1	Z5050-03-30		
84	Lager	Grooved Bearing	1		6009/ 45×75×16	0406009R
85	Lagerbock	Bearing block	1	Z5050-03-28		0303450385
86	Schmiernippel	grease nipple	2	GB1155-79	10	0340113
87	Handrad	Hand Wheel	1	Z5050-03-90-1		0303450387
88	Handrad Ring	Hand Wheel Spacer	1	Z5050-03-90-2		
89	Endstöpsel	End Cap	1	Z5050-03-88		0303450389
90	Lager	Grooved Bearing	1		6304/ 20×52×15	0406304R
91	Mutter	Nut	1	Z5050-03-86		
92	Tellerfeder	Dish Spring	3	GB/T1972-1992	25.4×50×2×3.4	0303450392
93	Auflage	Friction Pad	1	Z5050-03-85		
94	Distanzscheibe	Spacer	1	Z5050-03-122		
95	Schnecke	Double Thread Worm	1	Z5050-03-77	Z=2 m=2	0303450395
96	Auflage	Friction Pad	1	Z5050-03-85		
97	Zahnrad	Gear	1	Z5050-03-69	Z=22 m=2	0303450397
98	Zahnrad	Gear	1	Z5050-03-74	Z=26 m=2	0303450398
99	Zahnrad	Gear	1	Z5050-03-70	Z=33 m=2	0303450399
100	Zahnrad	Gear	1	Z5050-103-71	Z=41 m=2	03034503100
101	Scheibe	Washer	1	Z5050-03-89		
102	Gewindestift	Lock Screw	1	Z5050-03-81		
103	Scheibe	Washer	1	Z5050-03-87		
104	Adapter	Socket Flat Adapter	1	GB77-85	M8×10	
105	Welle	Shaft	1	Z5050-03-75		03034503105
106	Federstift	Spring Pin	2	GB879-86	6×26	
107	Passfeder	Key	1	GB1567-79	8×5×60	
108	Kugellager	Ball Bearing	1		6304/ 20×52×15	0406304R
109	Endkappe	End Cap	1	Z5050-03-88		
110	Zahnstange-Welle	Rack Shaft	1	Z5050-03-60		03034503110
111	Rolle	Roller	1	Z5050-03-61		03034503111
112	Scheibe	Washer	1	Z5050-03-62		
113	Innensechskantschraube	Socket head screw	1	GB70-85	M6×16	
114	Kugel	Ball	18	GB308-84	8	042KU08
115	Hohlwelle	Hollow shaft	1	Z5050-03-92		03034503115
116	Lager	Grooved Bearing	1		6006/ 30×55×13	0406006R
117	Scheibe	Washer	1	Z5050-03-78		
118	Schneckenrad	Worm Gear	1	Z5050-03-76	Z=37 m=1.75	03034503118
119	Gewindestift	Lock Screw	3	Z5050-03-81		
120	Zahnrad	Gear	1	Z5050-03-72	Z=48 m=2	03034503120
121	Zahnrad	Gear	1	Z5050-03-65	Z=47 m=2	03034503121
122	Zahnrad	Gear	1	Z5050-03-66	Z=44 m=2	03034503122
123	Zahnrad	Gear	1	Z5050-03-73	Z=39 m=2	03034503123
124	Zahnrad	Gear	1	Z5050-03-67	Z=33 m=2	03034503124
125	Zahnrad	Gear	1	Z5050-03-68	Z=22 m=2	03034503125
126	Scheibe	Washer	1	Z5050-03-79		
127	Lager	Grooved Bearing	1		6006/ 30×55×13	0406006R
128	Endkappe	End Cap	1	Z5050-03-80		
129	Spannstift	Spring Pin	2	GB879-86	5×16	
130	Halterung Vorschub	Feed Support	1	Z5050-03-02		
131	Kugel	Ball	1	GB308-84	8	042KU79

B50GSM - Ersatzteilliste - Spare part list						
Pos.	**Bezeichnung**	**Description**	**Menge Qty.**	**Zeichnungsnr. Drawing no.**	**Grösse Size**	**Artikelnummer Item no.**
132	Druckfeder	Compression Spring	1	GB2089-80	1×7×20	
133	Einfaßung flacher Adapter	Socket Flat Adapter	1	GB77-85	M10×10	
134	Innensechskantschraube	Socket head screw	4	GB70-85	M6×16	
135	Zahn-Welle	Gear shaft	1	Z5050-03-63	Z=17 m=2	03034503135
136	Gewindestift	Lock Screw	1	Z5050-03-81		
137	Distanzscheibe	Spacer	1	Z5050-03-64		
138	Sicherungsring	Retaining Ring	1	GB894.1-86	20	042SR20W
139	Wahldrehschalter Pinolenvorschub	Selector wheel	1	Z5050-03-84		03034503139
140	Zahn-Welle	Gear shaft	1	Z5050-03-07		03034503140
141	Spannstift	Spring Pin	1	GB879-86	5×18	
142	Endkappe	End Cap	1	Z5050-03-05		
143	Lager	Grooved Bearing	2		6204/ 20×47×14	0406204R
144	Zahnrad	Gear	1	Z5050-03-06	Z=44 m=2	03034503144
145	Sicherungsring	Retaining Ring	1	GB894.1-86	28	042SR28I
146	Zahnrad	Gear	1	Z5050-03-08	Z=24-29-19	03034503146
147	Dichtung	Frame Oil Seal	1	GB13871-1992	20×35×7	04120357
148	Zahn-Welle	Teeth Axle	1	Z5050-03-11		03034503148
148-1	Endkappe	End Cap	1	Z5050-03-10		030345031481
149	Lager	Grooved Bearing	2		6304/ 25×52×15	0406304R
150	Distanzscheibe	Spacer Ring	1	Z5050-03-12		
151	Zahnrad	Gear	1	Z5050-03-13	Z=36 m=2.25	03034503151
152	Zahnrad	Gear	1	Z5050-03-14	Z=20 m=2.25	03034503152
153	Zahnrad	Gear	1	Z5050-03-15	Z=30 m=2.25	03034503153
154	Zahnrad	Gear	1	Z5050-03-16	Z=40 m=2.25	03034503154
155	Scheibe	Spacer	1	Z5050-03-17		
156	Zahn-Welle	Gear shaft	1	Z5050-03-19		03034503156
157	Passfeder	Key	2	GB1096-79	8×18	042P8820
158	Endkappe	End Cap	1	Z5050-03-18		03034503158
159	Lager	Grooved Bearing	2		6305/ 25×62×17	0406305R
160	Distanzscheibe	Spacer	1	Z5050-03-20		03034503160
161	Sicherungsring	Support Bush	1	GB894.1-86	45	042SR45W
162	Zahnrad	Gear	1	Z5050-03-22	Z=40 m=2.25	03034503162
163	Zahnrad	Gear	1	Z5050-03-21	Z=24 m=2.25	03034503163
164	Lager	Grooved Bearing	1		NK 25/16- 25×33×16	040HK2516
165	Lager	Grooved Bearing	1		NK 25/2025×33×20	040HK2520
166	Distanzscheibe	Spacer	1	Z5050-03-23		03034503166
167	Zahnrad	Gear	1	Z5050-03-24	Z=40 m=2.25	03034503167
168	Distanzscheibe	Spacer	1	Z5050-03-25		
169	Zahnrad	Gear	1	Z5050-03-26	Z=19 m=2.25	03034503169
170	Scheibe	Washer	1	Z5050-03-27		03034503170
171	Schnecke	Worm	1	Z5050-03-37		03034503171
172	Passfeder	Key	1	GB1096-79	6×22	
173	Sicherungsring	Axle Retainer	1	GB894.1-86	20	042SR20W
174	Schneckenrad	Gear	1	Z5050-03-39	Z42 m2	03034503174
175	Lager	Grooved Bearing	2		6204/ 20×47×14	0406204R
176	Dichtung	Seal	1	GB13871-1992	20×35×7	04120357
177	Dichtungsring	Sealing Ring	1	GB3452.1-82	42.5×2.65	03034503177
178	Buchse	Bushing	1	Z5050-03-40		03034503178
179	Sitz-Handgriff	Handle Seat	1	Z5050-03-95		03034503179
180	Mutter	Round Nut	1	Z5050-03-94		03034503180
181	Lager	Grooved Bearing	1		6006	0406006R
182	Sicherungsring	Retainer	2	GB893.1-86	55	042SR55W
183	Halterung-Lager	Bearing Holder	1	Z5050-03-96		03034503183
184	Innensechskantschraube	Socket head screw	3	GB70-85	M8×20	
185	Keil	Spline Bush	1	Z5050-03-97		03034503185
186	Distanzscheibe	Spacer	1	Z5050-03-103		
187	Distanzscheibe	Spacer	1	Z5050-03-101		
188	Zylinderstift	Cylindrical Pin	8	GB119-86	4×10	
189	Ring	Connection Ring	1	Z5050-03-102		
190	Schraube	Screw	3	Z5050-03-125		
191	Scheibe	Washer	1	Z5050-03-100		
192	Ring	Connector ring	1	Z5050-03-99		
193	Zylinderstift	Cylindrical Pin	6	GB119-86	5×16	
194	Schneckenrad	Worm gear	1	Z5050-03-98		03034503194
195	Scheibe	Spacer	1	Z5050-03-104		
196	Nadellager	Needle Bearing	1		NK 45-20	040HK4520
197	Nadellager	Needle Bearing	1		NK 30-20	040HK3020
198	Laufbuchse	Bushing	1	Z5050-04-18-7		03034503198
199	Buchse	Bushing	1	Z5050-04-18-6		
200	Sicherungsring	Axle Retainer	1	GB894.1-86	25	042SR25W
201	Kreuzschlitzschraube	Crossed Pan Head Screw	3	GB818-85	M4×6	

B50GSM_parts.fm

B50GSM - Ersatzteilliste - Spare part list						
Pos.	**Bezeichnung**	**Description**	**Menge Qty.**	**Zeichnungsnr. Drawing no.**	**Grösse Size**	**Artikelnummer Item no.**
202	Abdeckung	Cover	1	Z5050-03-108	1.5	03034503202
203	Rückholfeder	Return spring	1	Z5050-03-107		03034503203
203	Rückholfeder	Return spring	1			03034503203A
204	Abdeckung	Spring cover	1	Z5050-03-106		03034503204
205	Innensechskantschraube	Socket head screw	3	GB70-85	M8×16	
206	Pinolenvorschubgriff	Spindle sleeve handle	4	Z5050-04-09		03034503206
207	Kreuzschlitzschraube	Crossed Pan Head Screw	4	GB818-85	M5×16	
208	Abdeckung	Cover	1	Z5050-03-93		03034503208
209	Passfeder	Key	2	GB1567-79	10×6×25	
210	Schaftritzel	Pinion shaft	1	Z5050-03-105	Z13,m3	030345031210
211	Passfeder	Key	1	GB1567-79	8×5×18	
212	Sicherungsring	Axle Retainer	1	GB894.1-86	12	042SR12W
213	Filter	Filter unit	1	Z5050-03-58-08		03034503213
214	Verschraubung	Fitting	1	Z5050-03-58-04		
215	Verschraubung	Fitting	1	Z5050-03-58-02		
216	Welle	Shaft	1	Z5050-03-58-03		
217	Zylinderstift	Spring Pin	1	GB897-86	4×18	
218	Schmierpumpe	Lubrication Pump	1	Z5050-03-58-01		03034503218CPL
220	Dichtungsring	Sealing Ring	1	GB3452.1-82	60×2.65	
221	Nutenstein	Sliding block	4	Z5050-03-58-06		
222	Feder	Spring	4	GB2089-80	0.5×7×16	
223	Zylinderstift	Spring Pin	1	GB897-86	2.5×20	
224	Regler	Regulator	1	Z5050-03-58-07		
225	Abdeckung	Cover	1	Z5050-03-58-05		
226	Innensechskantschraube	Socket head screw	6	GB70-85	M4×16	
226-1	Rohr	Pipe	1	Z5050-03-09		030345032261
227	Standfuss	Base	1	Z5050-01-01		03034503227
228	Kühlmittelschlauch	Cooling tube	1		16×1.5 l=1450	
229	Anschlussplatte	Plate	1	Z5035-07-06		
230	Schraube	Screw	4	GB/T70	M6×12	
231	Anschlussstutzen	Fitting	1	JB/T8870		
232	Schlauchanschluss	Tupe connector	1	Z5035-07-05		03034503232
233	Schraube	Screw	4	GB/T70	M6×12	
235	Kühlmittelschlauch	Cooling tube	1		16×1.5	
235-1	Kurbel	Crank	1	Z5050-01-09	2G400	030345032351
235-2	Griff	Handle	1		M16x20	030345032352
235-3	Schraube	Screw	1	GB/T 70	M8×30	
235-4	Buchse	Bushing	1	Z5050-01A-25	Buchse	030345032354
235-5	Scheibe	Gasket	1	Z5050-01A-13		030345032355
235-6	Schnecke	Worm	1	Z5050-01A-07		030345032356
235-6M	Schnecke	Worm	1			030345032356M
235-7	Zylinderstift	Spring Pin	1	GB879-86	6×35	030345032357
236	Bolzen	Stud	3	GB/T898	M6×60	
237	Klemmhebel	Lock Handle	2	HY8310.12-3	A-M16×114	0333440011
238	Scheibe	Washer	3	GB/T97.1	16	
239	Sechskantschraube	Screw	3	GB/T5782	M16×65	
240	Scheibe	Washer	2	GB/T97.1	16	
241	Mutter	Nut	2	GB/T6170	M16	
242	Scheibe	Washer	1	GB/T97.1	16	
243	Halterung Bohrsäule	Bracket	1	Z5050-01A-26		03034503243
244	Zahnrad	Gear	1	Z5050-01-10		03034503244
245	Welle	Shaft	1	Z5050-01A-27		03034503245
246	Schmiernippel	Grease nipple	1	JB/T7940.4	8	0340114
247	Schraube	Screw	1	GB/T78	M8×20	
248	Mutter	Nut	1	GB/T6170	M8	
249	Zahnstange	Rack	1	Z5050-01-06		03034503249
250	Bohrsäule	Column	1	Z5050-01-02		03034503250
251	Scheibe	Washer	1	JB/T8870	22-32	
252	Mutter	Nut	1	GB/T6171	M20×2	
253	Flexibler Kühlmittelschlauch	Flexible cooling Pipe	1	JB/TGQ0627-88	G3/8?	0340316
254	Aufnahme Bohrtisch	Table support	1	Z5050-01A-03		
255-1	Sieb	Screen	1	Z5050-01-14		030345032551
255	Bohrtisch	Table	1	Z5050-01-04		03034503255
256	Klemmhebel	Lock Handle	1	HY8310.12-3	A-M16×114	0333440011
257	Scheibe	Washer	1	GB/T97.1	16	
258	Gewindestange	Thread rod	1	GB/T898	M16×75	
259	Platte	Plate	1	Z5050-01-05		03034503259
260	Schraube	Screw	3	GB/T70	M6×20	
261	Schlauchanschluss	Pipe Connector	1	Z5035-07-03		
262	Anschlussstutzen	Fitting	1	JB/T8870	22-32	
263	Kühlmittelschlauch	Coolant tube	1		16×1.5 l=1500	
264	Winkelstück	Elbow	1	GB/T3289.2	G3/8	03034503264

B50GSM - Ersatzteilliste - Spare part list						
Pos.	**Bezeichnung**	**Description**	**Menge Qty.**	**Zeichnungsnr. Drawing no.**	**Grösse Size**	**Artikelnummer Item no.**
265	Aufnahme Winkelstück	Fitting	1	Z5050-01-11		03034503265
266	Anschlussstutzen	Fitting	1	JB/T8870	22-32	
267	Schlauchanschluss	Pipe Connector	1	Z5035-07-03		
268	Winkelstück	Elbow	1	GB/T3289.2	2G1/2?	
269	Platte	Plate	1	Z5035-07-04		03034503269
270	Schraube	Screw	1	GB/T70	M8×25	
271	Sieb	Screen	1	Z5050-01-15		
272	Scheibe	Washer	6	GB/T97.1	16	
273	Sechskantschraube	Screw	6	GB/T5782	M16×70	
277	Welle	Shaft	1	Z5050-01A-24		03034503277
278	Kupplung	clutch	1	Z5050-01A-22		
279	Kegelrad	Taper Gear	1	Z5050-01A-19		03034503279
280	Welle	Shaft	1	Z5050-01A-21		03034503280
281	Scheibe	Washer	1	Z5050-01A-20		
282	Passfeder	Key	1	GB1096-79	6×25	
283	Motor	Motor	1	GLF18-180-30		03034503283
284	Unterlegscheibe	Spring Washer	4	GB93-85	8	
285	Innensechskantschraube	Socket head screw	4	GB70-85	M8×25	
286	Passfeder	Key	1	GB1096-79	6×25	
287	Kegelrad	Taper Gear	1	Z5050-01A-23		03034503287
288	Gehäuse	Case	1	Z5050-01A-26		03034503288
289	Unterlegscheibe	Spring Washer	4	GB93-86	8	
290	Innensechskantschraube	Socket head screw	4	GB70-85	M8×25	
295	Abdeckplatte	Cover	1	Z5050-01A-18		03034503295
296	Innensechskantschraube	Socket head screw	4	GB70-85	M5×12	
297	Zylinderstift	Cylindrical Pin	1	GB119-86	5×12	
298	Handrad	Hand wheel	1	Z5050-01A-17		03034503298
299	Kugel	Ball	1	GB308-89	5	042KU05
300	Feder	Compression Spring	1	GB2089-80	1×4×20	
301	Gewindestift	Socket Flat Adapter	1	GB77-85	M6×10	
302	Gewindestift	Socket Cap Adapter	1	GB79-86	M10×25	
303	Mutter	Nut	1	GB6170-85	M10	
304	Passfeder	Key	1	GB1096-79	6×25	
305	Sicherungsring	Retainer	1			
306	Innensechskantschraube	Socket head screw	1			
307	Halterung	Holder	1			0302024149CPL
308	Rändelschraube	Knurled screw	1			
309	Innensechskantschraube	Socket head screw	1			
310	Alu-Profil	Aluminum profile	1			0302130381
311	Innensechskantschraube	Socket head screw	2			
312	Bohrfutterschutz	Drill chuck protection	1			03334403PG
CPL	Bohrfutterschutz komplett	Drill chuck protection complete	1			03034503PGCPL
313	Drucktaster	Press button	1			
314	Schalterplatte	Switch plate	1			
315	Aufnahme Bohrtisch	Table support	1			03034503315
316	Platte	Plate	1			
317	Taster Vorschub	Button Feed	2			
318	Lüfterrad	Fan wheel	1			
319	Motordeckel	Motor cover	1			
401	Welle	Shaft	1			03034500401
402	Scheibe	Washer	1			03034500402
403	Motor	Motor	1			
404	Buchse	Bushing	1			03034500404
405	Gehäuse	Housing	1			03034500405
406	Kegelrad	Bevel gear	1			03034500406
407	Kegelrad	Bevel gear	1			03034500407
408	Flansch	Flange	1			03034500408
409	Scheibe	Washer	1			03034500409
410	Abdeckung	Cover	1			03034500410
411	Kurbel	Crank	1			
412	Kupplung	Clutch	1			
413	Handhebel	Handle	1			
414	Bolzen	Bolt	1			03034500414
415	Innensechskantschraube	Socket head screw	4		ISO 4762 - M6 x 16	
416	Zylinderstift	Cylindrical stift	2		ISO 2338 - 5 h8 x 20	
417	Innensechskantschraube	Socket head screw	6		ISO 4762 - M5 x 10	
418	Passfeder	Fitting key	2		DIN 6885 - A5*5*25	03034500418
419	Sicherungsring	Retaining ring	1		DIN 471 - 20x1,2	042SR20W
420	Schmiernippel	Lubrication cup	1			03034500420
421	Feder	Spring	3			

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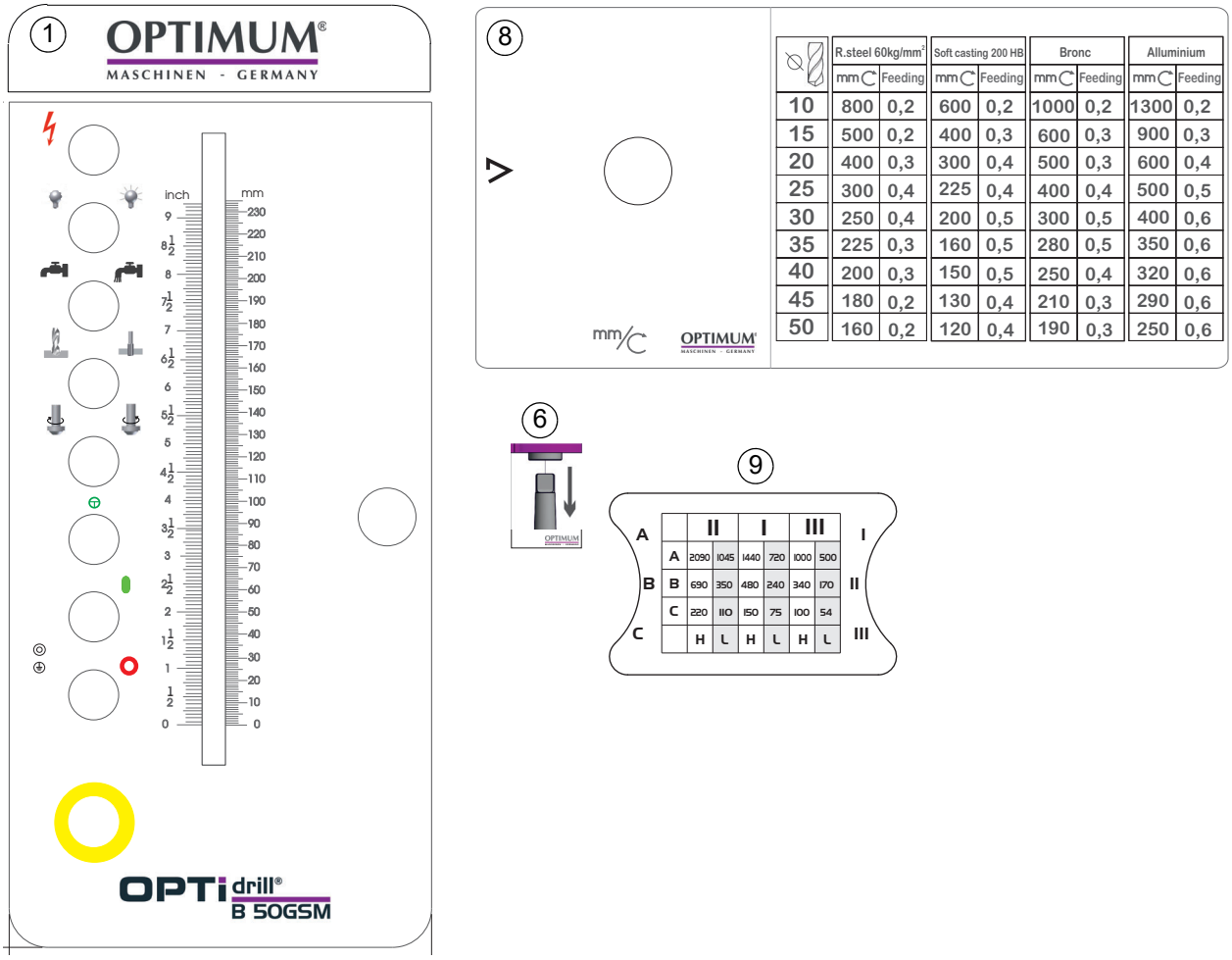
M Maschinenschilder - Machine labels



Img. 8-1: Maschinenschilder - Machine labels

Maschinenschilder - Machine labels					
Pos.	**Bezeichnung**	**Description**	**Menge Qty.**	**Grösse Size**	**Artikelnummer Item no.**
1	Frontschild	Front label	1		
4	Schild Kühlmittelpumpe	Colant pump label	1		
5	Hinweisschild	Instruction label	1		
6	Hinweisschild	Instruction label	1		
8	Getriebeschild Vorschub	Gear box label feed	1		
9	Getriebeschild Drehzahl	Gear box label speed	1		03034503L09

8.5 Schaltplan - Wiring diagram

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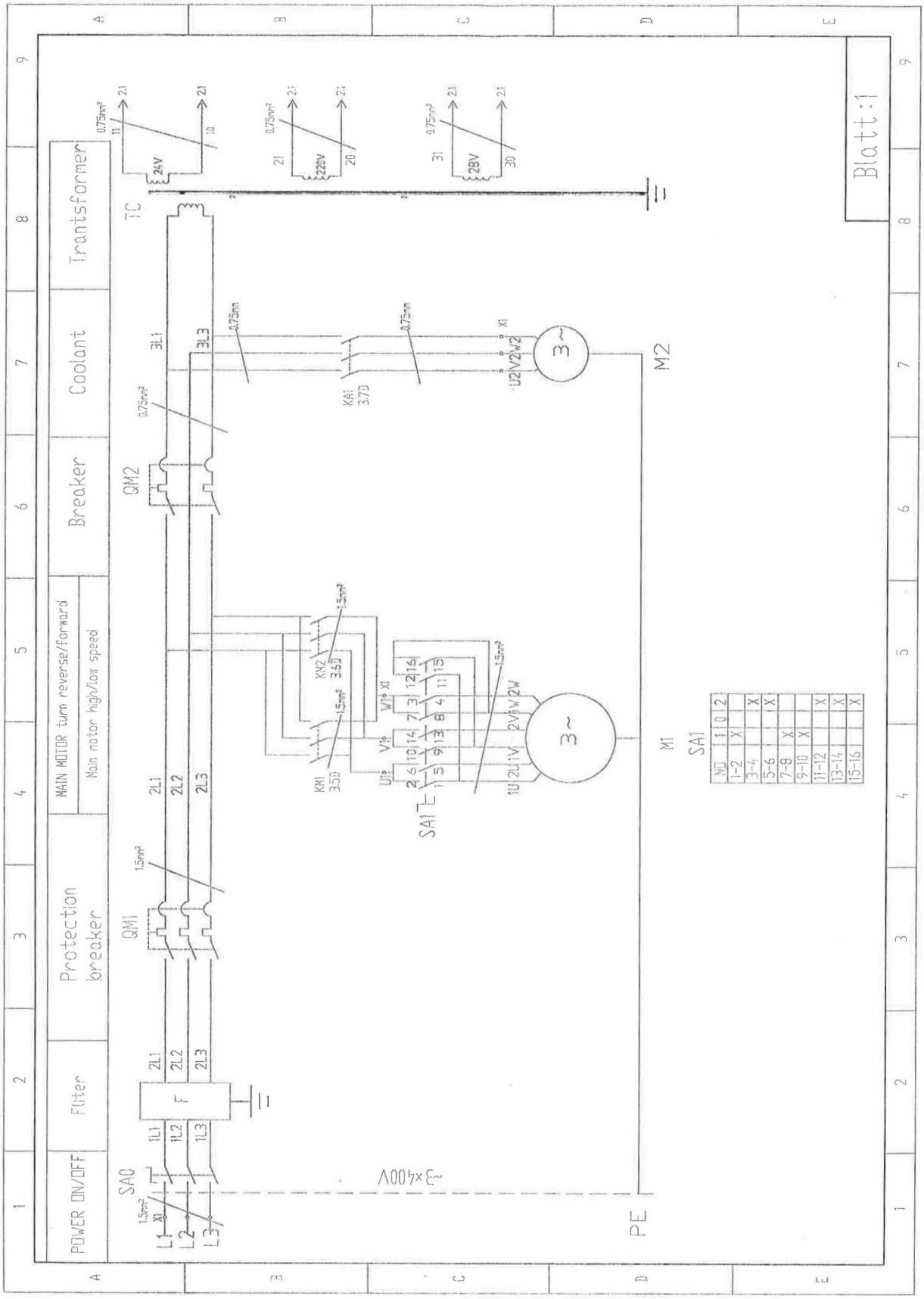

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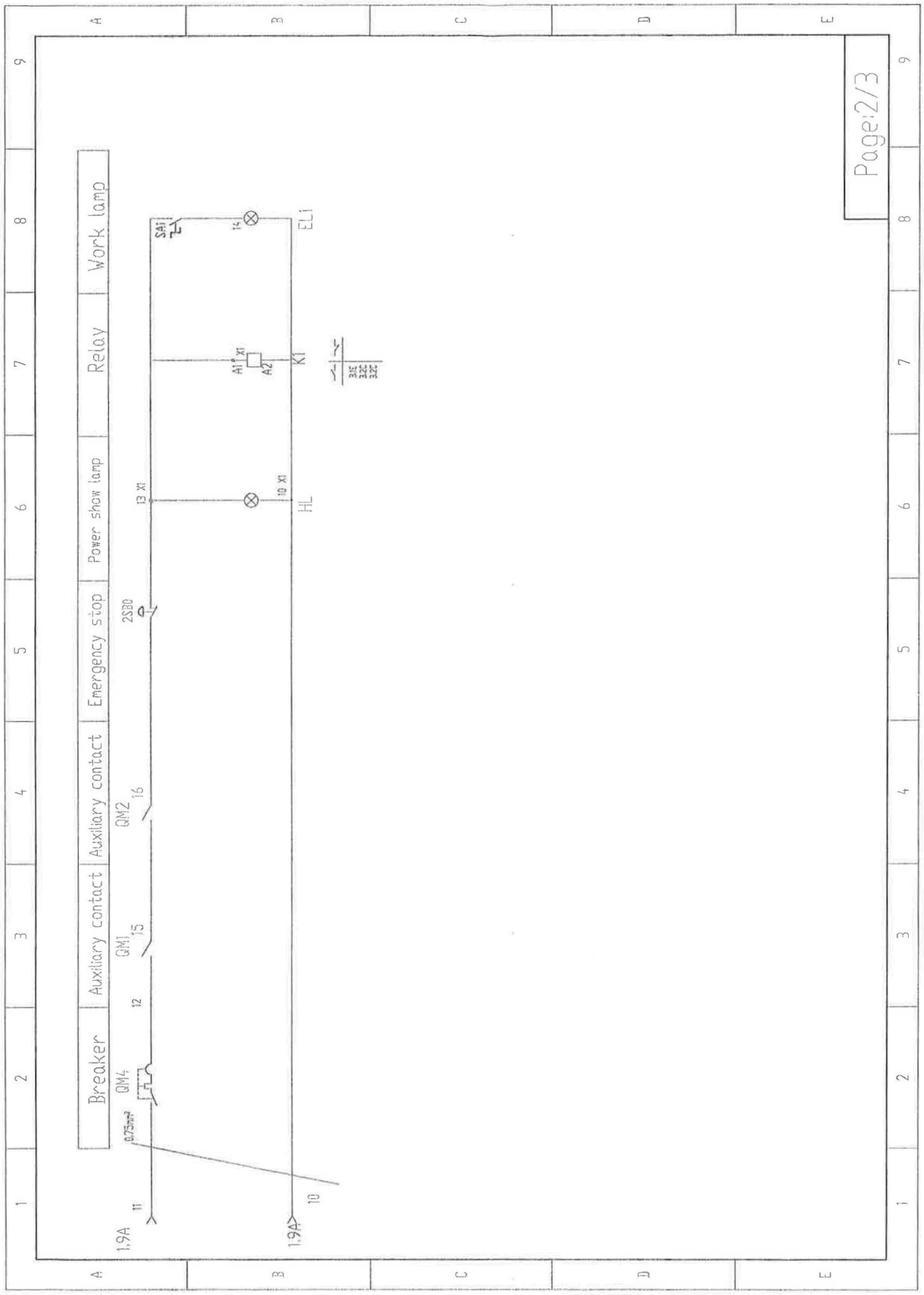

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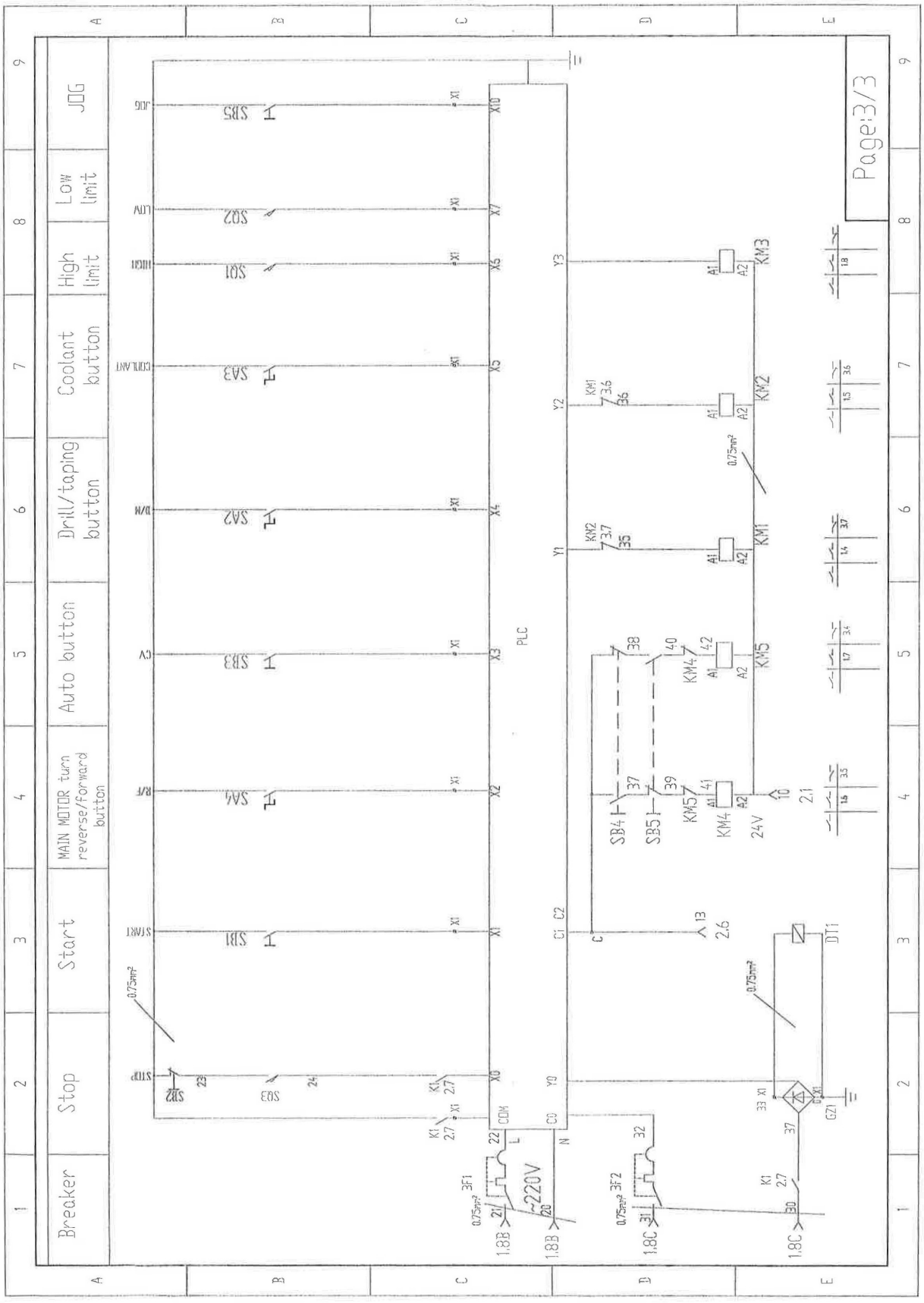

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Elektrische Bauteile - Electric components				
Pos.	**Bezeichnung**	**Description**	**Grösse Size**	**Artikelnummer Item no.**
SA0	Hauptschalter	Main switch	LW8GS-25/3000-A	0460047
SA1	Stufenschalter	Step switch	LW8PS--20/4D503	03334400SA
	Steuerrelais	Control relay	HH54PL AC24V	
	Motorschütz	Motor contactor	3TB4122 24V 50/60HZ	0460020
	Relais Kühlmittelpumpe	Coolant pump relay		
	Relais Tischvorschub	Table feed relays		
TC	Transformator	Transformer	JBK5-100 400V/ 24V,28V,220V	0460050
HL	Betriebsleuchte	Work light		03034503HL1
	Schalter Maschinenlicht	Machine light switch	C2SS1-10B-10	03034503SA1
	Schalter Betriebsart	Mode switch	C2SS1-10B-10	03034503SA1
	Schalter kühlmittelpumpe	Cooling pump	C2SS1-10B-10	03034503SA1
	Drehrichtungsschalter	Change-Over switch	C2SS1-10B-10	03034503SA1
	NOT-Halt Schalter	Emergency stop button	MPET3-10R+MCB-01	03334400SB0
	Ein-Taster	Start button		03334403SB1
	Aus-Taster	Stop button	CP1-10R-01	03034503SB2
	Taster Aut. Vorschub	Aut. feed button	LAS1-A	0333440069
	Taster Tischverstellung	Table feed button		
	Momenttaster	Direct run button		
	Sicherheitsschalter Werzeugaustreiber	Tool change safety switch		
	Sicherheitsschalter Bohrfutterschutz	Chuck safety switch		
	Antriebsmotor	Main motor	YD100L-4/8	03034503M1
	Kühlmittelpumpe	Cooling pump motor	AYB-12	0333440004
	Motor Tischverstellung	Table feed motor		
	Sicherungsautomat	Circuit breakers	DZ541-63 D6/3P	0460048
	Sicherungsautomat	Circuit breakers	DZ541-63 D1/2P	0460039
	Sicherungsautomat	Circuit breakers	DZ451-63 C3/1P	0460036
	Sicherungsautomat	Circuit breakers	DZ451-63 C1/1P	
	Sicherungsautomat	Circuit breakers	DZ451-63 C1/1P	
	Sicherungsautomat	Circuit breakers	DZ451-63 C3/1P	0460036
	PLC	PLC	EX-30A1-B	03334400PLC
	Gleichrichter	AC-DC Inverter	KBPC10-10	03034503GZ
	Endschalter Vorschub	Feed limit switch		0460016
	Endschalter	Limit switch		
	Maschinenlampe	Machine lamp		03334400EL1
	Elektro kupplung	Electric coupling		03034503DT

Schmierstoffe Lubricant Lubrifiant	Viskosität Viskosity Viscosité ISO VG DIN 51519 mm²/s (cSt)	Kennzeich- nung nach DIN 51502	ARAL	BP	Esso	KLÜBER LUBRICATION	Mobil	Shell	TEXACO
Getriebeöl Gear oil Huile de réducteur	VG 680	CLP 680	Aral Degol BG 680	BP Energol GR-XP 680	SPARTAN EP 680	Klüberoil GEM 1-680	Mobilgear 636	Shell Omala S2 GX 680	Meropa 680
	VG 460	CLP 460	Aral Degol BG 460	BP Energol GR-XP 460	SPARTAN EP 460	Klüberoil GEM 1-460	Mobilgear 634	Shell Omala S2 GX 460	Meropa 460
	VG 320	CLP 320	Aral Degol BG 320	BP Energol GR-XP 320	SPARTAN EP 320	Klüberoil GEM 1-320	Mobilgear 632	Shell Omala S2 GX 320	Meropa 320
	VG 220	CLP 220	Aral Degol BG 220	BP Energol GR-XP 220	SPARTAN EP 220	Klüberoil GEM 1-220	Mobilgear 630	Shell Omala S2 GX 220	Meropa 220
	VG 150	CLP 150	Aral Degol BG 150	BP Energol GR-XP 150	SPARTAN EP 150	Klüberoil GEM 1-150	Mobilgear 629	Shell Omala S2 GX 150	Meropa 150
	VG 100	CLP 100	Aral Degol BG 100	BP Energol GR-XP 100	SPARTAN EP 100	Klüberoil GEM 1-100	Mobilgear 627	Shell Omala S2 GX100	Meropa 100
	VG 68	CLP 68	Aral Degol BG 68	BP Energol GR-XP 68	SPARTAN EP 68	Klüberoil GEM 1-68	Mobilgear 626	Shell Omala S2 GX 68	Meropa 68
	VG 46	CLP 46	Aral Degol BG 46	BP Bartran 46	NUTO H 46 (HLP 46)	Klüberoil GEM 1-46	Mobil DTE 25	Shell Tellus S2 MX 46	Anubia EP 46
	VG 32	CLP 32	Aral Degol BG 32	BP Bartran 32	NUTO H 32 (HLP 32)	Klübersynth GEM 4- 32 N	Mobil DTE 24	Shell Tellus S2 MX 32	Anubia EP 32
Hydrauliköl Hydraulic oil Huile hydraulique	VG 32	CLP 32	Aral Vitam GF 32	BP Energol HLP HM 32	NUTO H 32 (HLP 32)	LAMORA HLP 32	Mobil Nuto HLP 32	Shell Tellus S2 M 32	Rando HD HLP 32
	VG 46	CLP 46	Aral Vitam GF 46	BP Energol HLP HM 46	NUTO H 46 (HLP 46)	LAMORA HLP 46	Mobil Nuto HLP 46	Shell Tellus S2 M 46	Rando HD HLP 46
Getriebefett Gear grease Graisse de réducteur		G 00 H-20	Aral FDP 00 (Na-verseift) Aralub MFL 00 (Li-verseift)	BP Energrease PR-EP 00	FIBRAX EP 370 (Na-verseift)	MICROL-UBE GB 00	Mobilux EP 004	Shell Alva-nia GL 00 (Li-verseift)	Marfak 00

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Spezialfette, wasserabweisend Special greases, water resistant Graisses spéciales, déperlant			Aral Aralub	Energrease PR 9143		ALTEMP Q NB 50 Klüberpaste ME 31-52	Mobilux EP 0 Mobil Greas-erex 47		
Wälzlagerfett Bearing grease Graisse de roulement		K 3 K-20 (Li-verseift)	Aralub HL 3	BP Energrease LS 3	BEACON 3	CEN-TOPLEX 3	Mobilux 3	Shell Alva-nia R 3 Alva-nia G 3	Multifak Pre-mium 3
Öle für Gleitbahnen Oils for slideways Huiles pour glissières	VG 68	CGLP 68	Aral Deganit BWX 68	BP Maccurat D68	ESSO Febis K68	LAMORA D 68	Mobil Vactra Oil No.2	Shell Tonna S2 M 68	Way lubri-cant X 68
Öle für Hochfrequenzspin-deln Oils for Built-in spindles Huiles pour broches à haute vitesse	VG 68		Deol BG 68	Emergol HLP-D68	Spartan EP 68		Drucköl KLP 68-C	Shell Omala 68	
Fett für spezielle Schmi-erungen an CNC Werkzeu-gmaschinen (Fließfett) Grease for special lubrica-tion on CNC machine tools Graisse pour lubrification spéciale sur machines-out-ils CNC	NLGI Klasse 000 NLGI class 000		ARALUB BAB 000	Grease EP 000	Shell Gadus S4 V45AC	CEN-TOPLEX GLP 500	Mobilux EP 023		Multifak 264 EP 000
Fett für Hochfrequenzspin-deln Grease for Built-in spindles Graisse pour broches à haute vitesse	METAFLUX-Fett-Paste (Grease paste) Nr. 70-8508 METAFLUX-Moly-Spray Nr. 70-82 Techno Service GmbH ; Detmolder Strasse 515 ; D-33605 Bielefeld ; (++49) 0521- 924440 ; www.metaflux-ts.de								
Kühlschmiermittel Cooling lubricants Lubrifiants de refroidisse-ment			Aral Emusol	BP Sevora	Esso Kutwell		Mobilcut	Shell Adrana	Chevron Sol-uble Oil B

OPTIMUM®
MASCHINEN - GERMANY

9 Malfunctions

Malfunction	Cause/ possible effects	Solution
Noise during work.	• Spindle is too little lubricated • Tool is blunt or wrongly clamped	• Grease spindle • Use new tool and check securing (fixed setting of the bit, bit holder and chuck).
Bit „burnt“	• Incorrect speed/feed too fast • Chips do not come out of the drill hole • Drill blunt • No or too little cooling	• Select another speed • Extract drill more often during work • Sharpen or use new drill • Use cooling agent
Drill tip is running off centre, the drilled hole is non-round	• Hard points on the workpiece • Length of the cutting spirals/or angles on the tool are unequal. • Drill deformed	• Use new drill
Drill bit defective.	• No base / support used.	• Use support and clamp it with the workpiece
Drill bit runs unround or wobbles.	• Drill deformed • Worn out spindle bearings • Drill is not correctly clamped. • Drill chuck defective	• Use new drill • Have the spindle bearings replaced • Correctly clamp drill • Replace the drill chuck
It is not possible to insert the drill chuck or the taper mandrel	• Dirt, grease or oil on the taper inside of the drill chuck or on the taper surface of the drill spindle	• Clean surfaces well • Keep surfaces free of grease
Motor does not start	• Motor is wrongly connected • Defective fuse	• Have it checked by authorised personnel
Motor is overheating and there is no power	• Motor overloaded • Too low mains voltage • Motor is wrongly connected	• Reduce feed rate Disconnect immediately and have it checked by authorized personnel • Have it checked by authorised personnel
Precision of the work deficient	• Irregularly heavy or tensed workpiece • Inexact horizontal position of the part holder	• Balance the piece statically and secure without straining • Adjust part-holder
Drilling spindle sleeve does not return to its initial position	• Spindle return spring does not work • Locking bolt inserted	• Check spindle return spring, replace it, if necessary • Pull out locking pin
The drilling sleeve may not be moved downwards.	• Locking bolt inserted • Drill depth adjustment no released	• Pull out locking pin • Release drill depth adjustment
Spindle bearing overheating	• Bearing worn down • Bearing pretension is too high • Working at high drilling speed over a longer period of time.	• Replace • Reduce bearing slack for fixed bearing (conical-roller bearing) • Reduce drill speed and feed rate

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Malfunction	Cause/ possible effects	Solution
Working spindle rattling on rough piece surfaces	• Excessive slack in bearing • Working spindle moves up and down • Adjustment strip loose • Clamping chuck is loose • Tool is blunt • Workpiece is loose	• Readjust bearing slack or replace bearing • Readjust bearing clearance (fixed bearing) • Adjust strip to the correct slack using the adjusting screw • Check, re-tighten. • Sharpen or replace tool • Clamp the workpiece firmly.

10 Appendix

10.1 Copyright

This document is copyright. All derived rights are also reserved, especially those of translation, re-printing, use of figures, broadcast, reproduction by photo-mechanical or similar means and recording in data processing systems, neither partial nor total.

Subject to technical changes without notice.

10.2 Terminology/Glossary

Term	Explanation
Drill drift	Tool to release the bit or the drill chuck from the drill spindle
drill chuck	Drill bit chuck
Drill head	Upper part of the geared drill
Drill sleeve	Fixed hollow shaft in which the drilling spindle turns
Drilling spindle	Shaft activated by the motor
Drilling table	Supporting surface, clamping surface
Taper mandrel	Cone of the drill or of the drill chuck
Spindle sleeve lever	Manual operation for the drill feed
Quick action - drill chuck	Drill chuck can be fixed by hand.
Workpiece	Piece to be drilled or machined.
Tool	Milling cutter, drill bit, countersink, etc.
Locking pin	Bolts for holding the drilling spindle sleeve in a certain height for the removing of the drill chuck or tool.

10.3 Change information operating manual

Chapter	Short note	new version number
EC declaration	changed standard	1.0.7
EC declaration Advanced information on inspection intervals	revised standards (EMC, LVD)	1.1.0
CE	EN ISO 13849	1.1.1
4.4	stored energy	1.1.2
2 + 4	Speeds for ~60Hz connection	1.1.3
3	Interdepartmental transport	1.1.4
2 ; 6.2	HLP 46 oil replaced with ISO VG 150 oil	1.1.5
8.4	Wiring diagram updated	1.1.6

10.4 Liability claims for defects / warranty

Beside the legal liability claims for defects of the customer towards the seller the manufacturer of the product, OPTIMUM GmbH, Robert-Pfleger-Straße 26, D-96103 Hallstadt, does not grant any further warranties unless they are listed below or had been promised in the frame of a single contractual agreement.

- The processing of the liability claims or of the warranty is performed as chosen by OPTIMUM GmbH either directly or through one of its dealers.
  Any defective products or components of such products will either be repaired or replaced by components which are free from defects. The property of replaced products or components passes on to OPTIMUM Maschinen Germany GmbH.
- The automatically generated original proof of purchase which shows the date of purchase, the type of machine and the serial number, if applicable, is the precondition in order to assert liability or warranty claims. If the original proof of purchase is not presented, we are not able to perform any services.
- Defects resulting of the following circumstances are excluded from liability and warranty claims:
  - Using the product beyond the technical options and proper use, in particular due to overstraining of the machine.
  - Any defects arising by one's own fault due to faulty operations or if the operating manual is disregarded.
  - Inattentive or incorrect handling and use of improper equipment.
  - Non-authorized modifications and repairs.
  - Insufficient installation and safeguarding of the machine
  - Disregarding the installation requirements and conditions of use.
  - Atmospheric discharges, overvoltage and lightning strokes as well as chemical influences.
- The following items are as well not subject to the liability or warranty claims:
  - Wearing parts and components which are subject to a standard wear as intended such as e.g. V-belts, ball bearings, illuminants, filters, sealings, etc.
  - Non reproducible software errors
- Any services which OPTIMUM GmbH or one of its agents performs in order to fulfill in the frame of an additional guarantee are neither an acceptance of the defects nor an acceptance of its obligation to compensate. Such services do neither delay nor interrupt the warranty period.
- Place of jurisdiction among traders is Bamberg.
- If one of the above mentioned agreements is totally or partially inefficient and/or null, it is considered as agreed what is closest to the will of the warrantor and which remains in the framework of the limits of liability and warranty which are predefined by this contract.

10.5 Storage

ATTENTION!

In case of wrong and improper storage electrical and mechanical machine components might get damaged and destroyed.

Store packed and unpacked parts only under the intended environmental conditions.

Follow the instructions and information on the transport case:

- O Fragile goods
  (Goods require careful handling)

- O Protect against moisture and humid environment
  ► Environmental conditions on page 18

- O Prescribed position of the packing case
  (Marking of the top surface - arrows pointing to the top)

- O Maximum stacking height

  Example:not stackable - do not stack a second packing case
  on top of the first packaging case

Consult Optimum Maschinen Germany GmbH if the machine and accessories are stored for more than three months or are stored under different environmental conditions than those given here.

10.6 Advice for disposal / Options of re-use

Please dispose of your machine in an environmentally friendly way, not by disposing of the waste not in the environment, but by acting in a professional way.

Please neither throw away the packaging nor the used machine later on, but dispose of them according to the guidelines established by your city council/municipality or by the corresponding waste management enterprise.

10.6.1 Decommissioning

CAUTION!

Used devices need to be decommissioned in a professional way in order to avoid later misuses and endangerment of the environment or persons.

- **Dsconnect the plug from the power supply.**
- **Cut the connection cable.**
- **Remove all environmentally hazardous operating fluids from the used device.**
- **If applicable remove batteries and accumulators.**
- **Disassemble the machine if required into easy-to-handle and reusable assemblies and component parts.**
- **Supply the machine components and operating fluids to the provided disposal routes.**

10.6.2 Disposal of the packaging of new devices

All used packaging materials and packaging aids of the machine are recyclable and generally need to be supplied to the material reuse.

The packaging wood can be supplied to the disposal or the reuse.

Any packaging components made of cardboard box can be chopped up and supplied to the waste paper collection.

The films are made of polyethylene (PE) and the cushion parts are made of polystyrene (PS). These materials can be reused after reconditioning if they are forwarded to a collection station or to the appropriate waste management enterprise.

Only forward the packaging materials correctly sorted to allow a direct reuse.

10.6.3 Disposing of the old device

INFORMATION

Please take care in your interest and in the interest of the environment that all component parts of the machine are only disposed of in the intended and admitted way.

Please note that the electrical devices include lots of reusable materials as well as environmentally hazardous components. Account for separate and professional disposal of the component parts. In case of doubt, please contact your municipal waste management. If appropriate, call on the help of a specialist waste disposal company for the treatment of the material.

10.6.4 Disposal of electrical and electronic components

Please make sure that the electrical components are disposed of professionally and according to the legal regulations.

The device includes electric and electronic components and must not be disposed of with the rubbish. According to the European directive 2002/96/EG regarding electrical and electronic used devices and the execution of national rights used electrical tools and electrical machines need to be collected separately and be supplied to an environmentally compatible reuse.

Being the machine operator you should obtain information regarding the authorized collection or disposal system which applies for your company.

Please make sure that the batteries and/or accumulators are disposed of in a professional way according to the legal regulations. Please only throw discharged batteries in the collection boxes in shops or at municipal waste management companies.

10.6.5 Disposal of lubricants and coolants

ATTENTION!

Please imperatively make sure to dispose of the used coolant and lubricants in an environmentally compatible way. Observe the disposal notes of your municipal waste management companies.

INFORMATION

Used coolant emulsions and oils should not be mixed up since it is only possible to reuse used oils which had not been mixed up without pre-treatment.

The disposal notes for the used lubricants are made available by the manufacturer of the lubricants. If necessary, request the product-specific data sheets.

10.7 Disposal via municipal collection

Disposal of used electrical and electronic components (Applicable in the countries of the European Union and other European countries with a separate collecting system for those devices).

The sign on the product or on its packing indicates that the product must not be handles as common household waist, but that is needs to be delivered to a central collection point for recycling. Your contribution to the correct disposal of this product will protect the environment and the health of your fellow men. The environment and the health are endangered by incorrect disposal. Recycling of material will help to reduce the consumption of raw materials. Your District Office, the municipal waste collection station or the shop where you have bought the product will inform you about the recycling of this product.

10.8 Product follow-up

We are required to perform a follow-up service for our products which extends beyond shipment.

We would be grateful if you could send us the following information:

- Modified settings
- Any experiences with the geared drill which might be important for other users
- Recurring failures

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B50GSM_GB_8.fm

EC - Declaration of Conformity

according to Machinery Regulation 2023/1230 Annex V Part A

The manufacturer / distributor Optimum Maschinen Germany GmbH
Dr.-Robert-Pfleger-Str. 26
D - 96103 Hallstadt, Germany

hereby declares that the following product

Product designation: Drilling machine

Type designation: B50GSM

fulfils all the relevant provisions of the Machinery Regulation specified above and the additionally applied directives (in the following) - including the changes which applied at the time of the declaration.

Description:

Hand-controlled drilling machine.

The following additional EU directives have been applied:

EMC Directive 2014/30/EU ; Restriction of the use of certain hazardous substances in electrical and electronic equipment 2015/863/EU

The following harmonized standards were applied:

EN 12717: 2009-07 Machine tools - Safety - Drilling machines

EN 60204-1: 2019-06 Safety of machinery - Electrical equipment of machines - Part 1: General requirements

EN 13849-1: 2016-06 Safety of machinery - Safety related parts of controls - Part 1: General design principles

EN 13849-2: 2013-02 Safety of machinery - Safety related parts of controls - Part 2: Validation

EN ISO 12100: 2011-03 Safety of machinery - General principles for design - Risk assessment and risk reduction

Name and address of the person authorized to compile the technical file:

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Kilian Stürmer (CEO, General Manager)
Hallstadt, 2023-11-07

Index

A
Accident report 16
Assembly 21
C
Classification of hazards 6
Customer service 46
Customer service technician 46
Cutting speeds 36
D
Dimensions 19
Disinfection
  Cooling lubricant tank 47
Disposal 80
Drill chuck
  assembly 33
  disassembly 32
Drilling capacity 17
Drilling table 17
E
EC - declaration of conformity 81
Electrical system
  safety 16
Emergency stop bush button 12
Environmental conditions 18
F
Floor loading 18
I
Inspection deadlines 16
Intended use 7
Interdepartmental transport 20
L
Lubrication 24
M
Malfunctions 74
Misuse 8
O
Obligations
  of the operating company 10
  of the operator 10
Operating material 18
operator's log 39
P
Personnel protective equipment 14
Pictograms 6
Q
Qualification of the staff
  Safety 9
S
Safety
  devices 11
  during maintenance 15
  during operation 15
Safety instructions 6
Service Hotline 49
Specialist dealer 46
Speeds 18
Spindle seat 17
Storage and packaging 21
T
Technical data
  drilling capacity 17
  drilling table 17
  Emissions 18
  Environmental conditions 18
  floor loading 18
  operating material 18
  Speeds 18
  Spindle seat 17
Technical Details
  Dimensions 19
  Working area 17
Tool
  disassembly 32, 33
Transport 20
Type plates 5
W
Warning notes 6
Working area 17

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